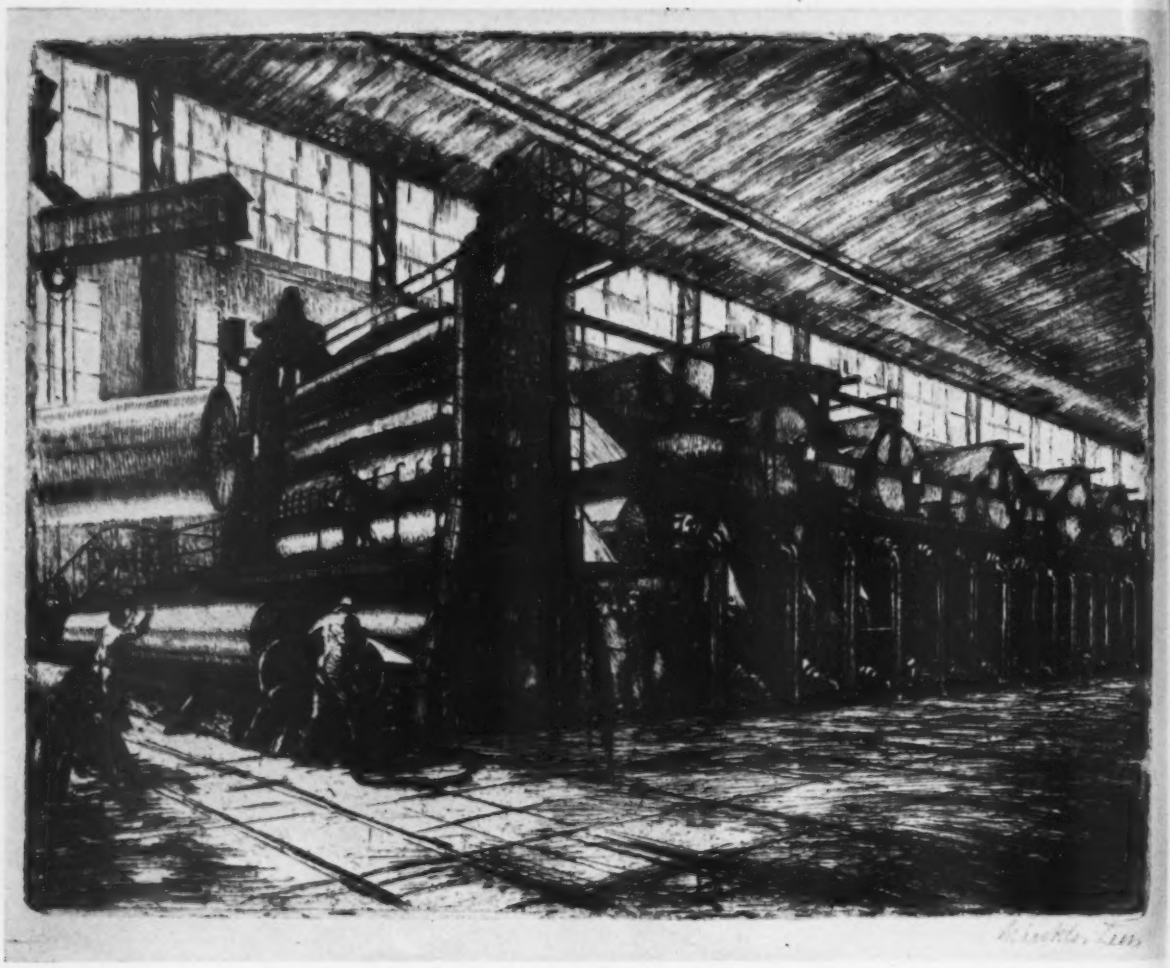
- Piping and fittings – available materials
- New products and raw materials
- ACS symposia on wood chemistry
- Chemigroundwood process operating data

The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

Aerial view of Georgia-Pacific's Toledo mill. *See story on page 156.*

ur 40th Year" June 1958



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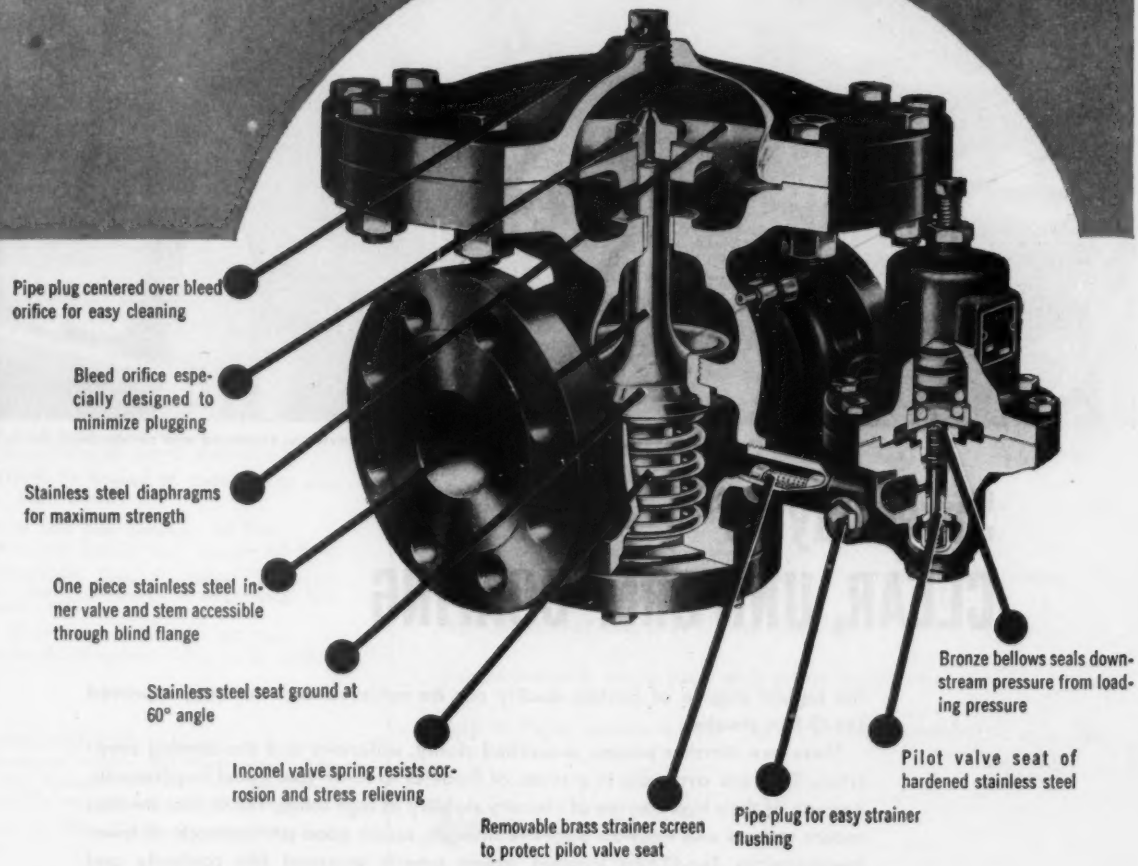
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The Paper Industry

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VOLUME 40 **NUMBER 3** **JUNE 1958**

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From our point of view..

Chemical research aids new and improved product development

The paper industry—constantly in search of new and improved products—will be interested in several new developments that were recently disclosed to the public.

The first of these is the announcement by Koppers at its Kobuta laboratories of a new, low-odor styrene butadiene latex. This latex has an 80-per cent styrene content and combines high greaseproof qualities with remarkably high gloss characteristics. The company claims that the gloss characteristics of this latex (with readings in the 90's) are of the order formerly obtainable only on the cast coater. Should it be possible to achieve similar results in commercial operations on the paper machine, an exceedingly bright future should be assured for this latex both in the paper adhesives and the paper coatings fields.

The second development is the opening of a new $5,000,000 laboratory by du Pont's Electrochemicals and Pigments departments for applications research and evaluation of new and improved company products.

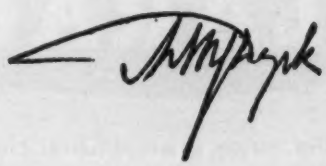
In the Pigments Department's laboratory, for instance, applications will be worked out for titanium dioxide produced by a new chloride process developed by du Pont. The advantages claimed for the titanium pigment produced by the chloride process include high uniformity and product quality and ease of wetting and dispersion in aqueous and oleoresinous vehicles.

One of the outstanding achievements by the Pigments Department is the development of a new family of red pigments characterized by exceptional lightfastness, brilliance, bleed resistance, chemical inertness and heat stability. The intensity of these reds is such that strong colors can be produced even when diluted with white or when used in metallic or polychromatic finishes. The exceptional properties of the new reds should make them ideally suitable for such purposes in the paper field as various formulations of printing inks.

The Electrochemicals Department is interested in the development of better bleaching methods with the use of sodium and hydrogen peroxides and with the application of polyvinyl alcohols and polyvinyl chloride and acetate resins in the fields of paper coatings and paper adhesives. A new bleaching process—to be adopted by a new kraft mill now under construction—produces an extremely high-quality pulp and will include peroxide, chlorine and chlorine dioxide bleaching stages arranged in series.

The reader who is familiar with the series of articles on paper coatings published in THE PAPER INDUSTRY and subsequently issued as a booklet will appreciate the importance of the polyvinyl alcohols and the polyvinyl acetate and chloride resins in paper coatings formulations.

The many readers who have expressed their appreciation for the coatings series will be glad to know that later this year we are beginning another series—on as extensive a scope as that of the coatings series—on the role of adhesives in the paper industry.



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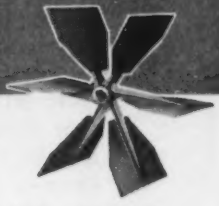

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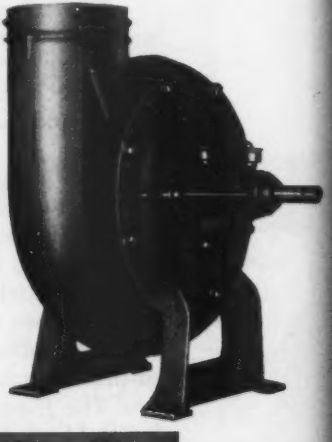

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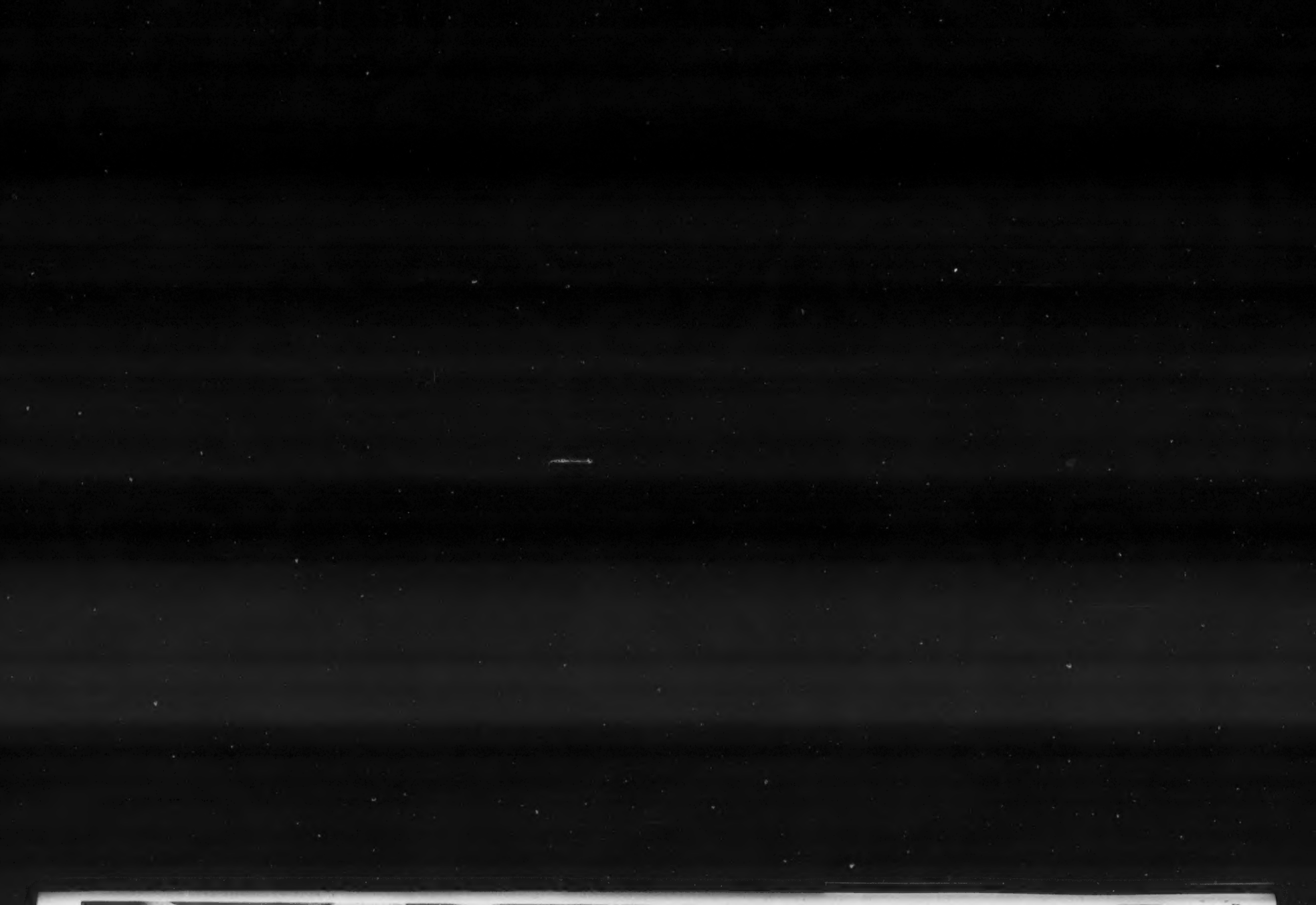

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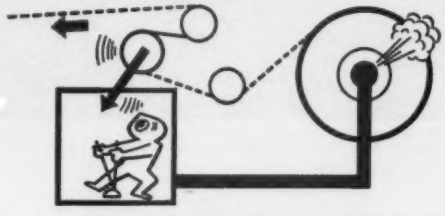

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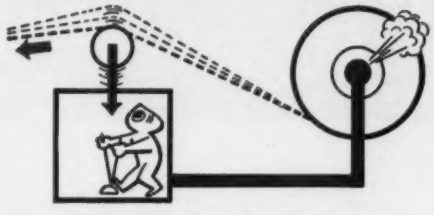

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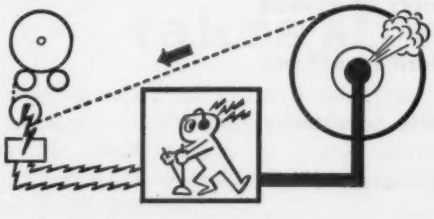

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Photo courtesy of St. Regis Paper Co., Jacksonville, Florida. 11'-6" x 20' Valveless Decker Saveall operating with new "Seminole Chief" Kraft Board Machine.

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Feature articles

Georgia-Pacific's Toledo mill in full operation

▶ Featuring a 262-in. Black-Clawson fourdrinier equipped with two Valley Iron Works headboxes, the new sulfate pulp, paper and board mill is an outstanding example of integrated operation.

WITH THE START-UP of its new $22,000,000 sulfate pulp, paper and board mill at Toledo, Ore., Georgia-Pacific Paper Co. is the most recent firm to expand its operations of lumber and plywood production into the field of pulp and paper.

The location of the mill on the tidal flat on the east bank of the Yaguina River required the construction of 6500 composite wood and concrete piles to provide adequate support for the building on the solid rock below. Altogether, 20,000 cu. yds. of concrete were poured into the foundation that supports the mill, and 750,000 cu. yds. of fill pumped from the Yaguina River bed were used to solidify and extend the mill site.

The new mill derives all its chips from the lumber and plywood mills that are located near the plant, and which are turning out 80,000,000 sq. ft. of Douglas fir plywood and 150,000,000 bd. ft. of quality lumber annually.

The window-less paper machine building is of structural steel frame and plywood wall construction with a wooden roof deck. The pulp mill is of structural steel frame construction with corrugated asbestos sheathing and precast concrete roof deck. Power plant, recausticizing plant, lime kiln and certain sections of the pulp plant are outdoor installations, although electrical equipment and controls are enclosed.

H. S. Daniels is president of Georgia-Pacific Paper, and W. J. Shelton is vice president and resident manager.

Sandwell & Co. Inc. of Seattle was engaged to provide the engineering service for the new mill, while Cornell, Howland, Hayes & Merryfield of Corvallis, Ore., engineered the off-site water supply and the effluent-disposal system.

Chip preparation and handling

Wood residue from the plywood and lumber mills is conveyed on wide rubber belt conveyors to the chippers. The chips are then conveyed through a pneumatic conveyor system approximately 3000 ft. long, first to a collecting point receiving chips from both the lumber and the plywood mill and then through a 16-in. 600-ft. long pipe across the cove to the 70,000-unit capacity chip pile near the mill. The 16-in. pipeline that handles 50 tons of chips per hour is supported on either side of the water by 190-ft. towers.

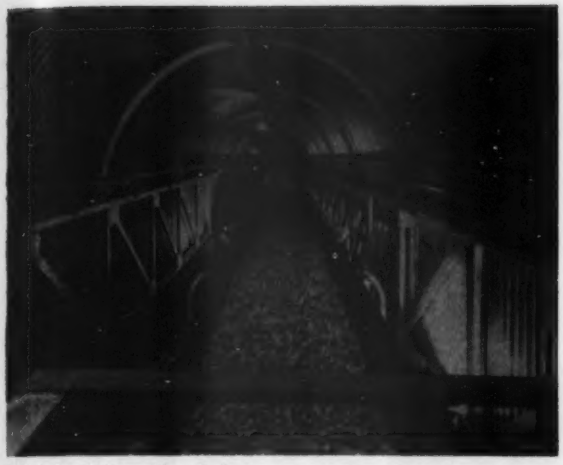
The remainder of the chip requirements is delivered by rail and truck, dumped into an unloading hopper and conveyed by a second pneumatic system to the chip storage area. A bulldozer on the chip pile moves the chips to two (one 12-ft. and one 17-ft.) rotary plate-type feeders that supply a 36-in. rubber belt that carriers them to the digesters.

Chip digestion and brown stock washing

Chips are discharged from the conveyor belt by a tripper into any one of the four 4650-cu. ft. digesters. The digesters, made of carbon steel, are designed for direct cooking. The digester bottoms through which cooking steam is injected are equipped with Esco Alloy 45S stainless steel 10 × 8 reducing elbows featuring a 4-in. heel outlet and flanges. The digester blow valves are electrically-operated and serve a common blow line leading to a 20-ft. diameter by 70-ft. high blow tank. The tank is equipped with a panel-type vertical agitator driven by a right-angle reducer.

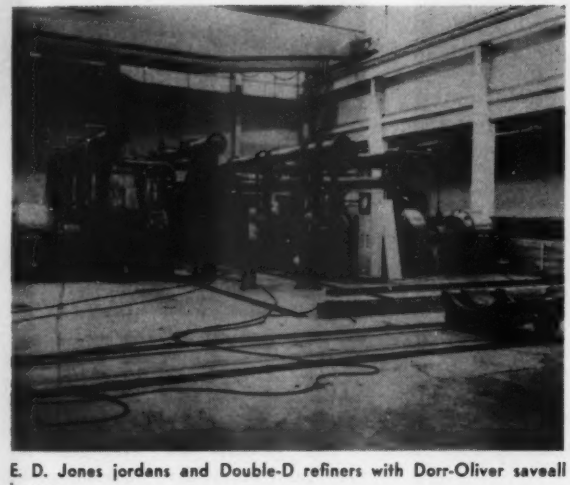
The direct-contact blow-heat recovery system featuring spiral heat exchangers supplies hot water for boiler make-up and for the brown stock washers.

From the blow tank pulp is pumped by two pumps driven by

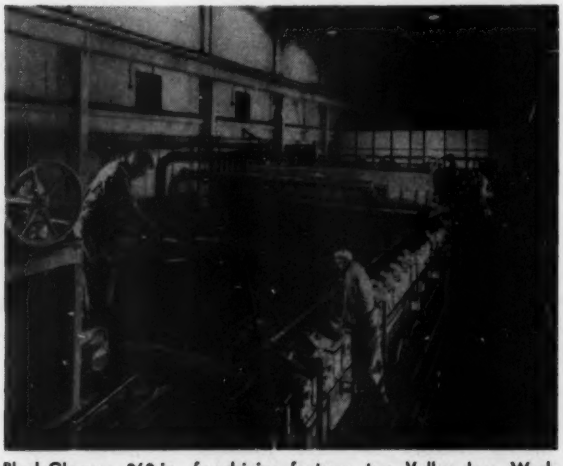


Link-Belt 36-in. rubber belt conveyer carries a continuous stream of chips to the digesters.

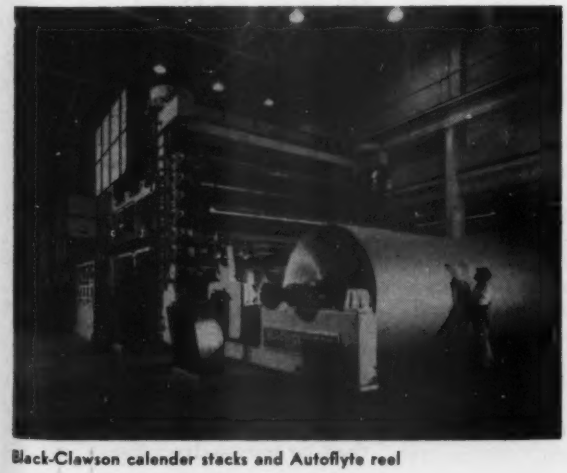
Another view of Link-Belt chip conveyer leading to digester and pulp washing building.



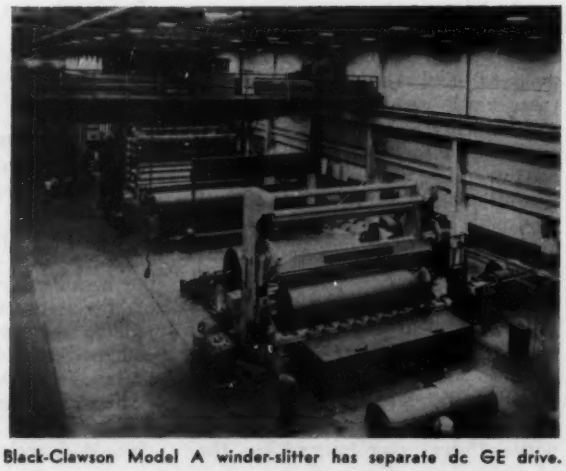
E. D. Jones jordans and Double-D refiners with Dorr-Oliver saveall in rear.



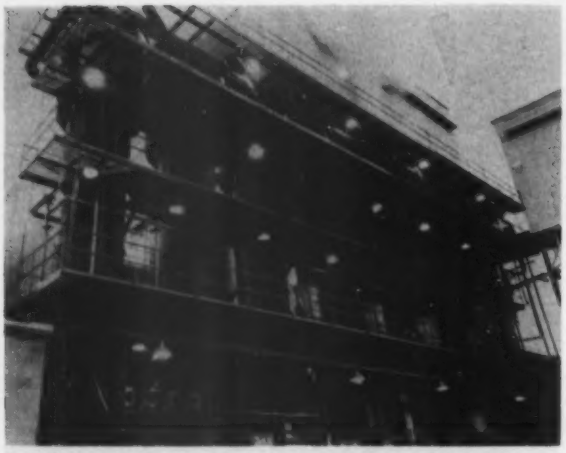
Black-Clawson 262-in. fourdrinier features two Valley Iron Works headboxes.



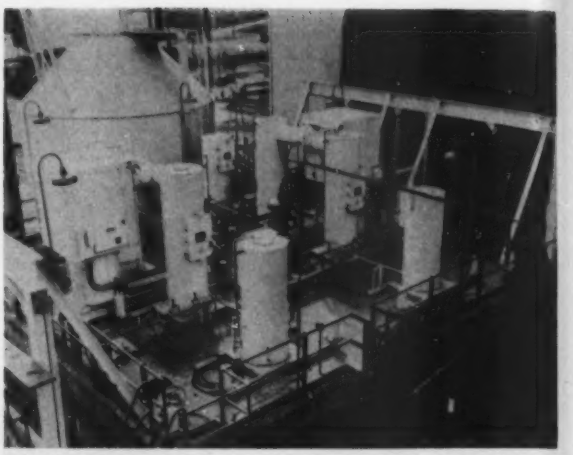
Black-Clawson calender stacks and Autoflyte reel



Black-Clawson Model A winder-slitter has separate dc GE drive.

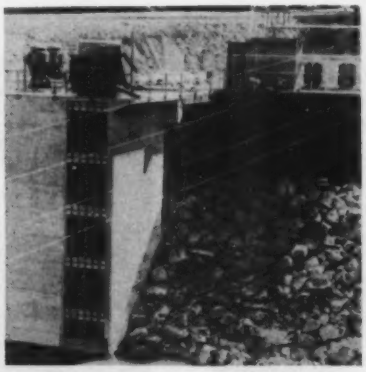


Rosenblad septuple-effect evaporators concentrate black liquor to 55 per cent solids.



Cylindrical housings contain the rapping devices of Kopper's double-chamber, two-field electrostatic precipitator.

Power and recovery building that houses Combustion Engineering boilers.



View of pumping station on the Siletz River.

Control on effluent line running 7½ miles to ocean.

400-hp motors to three Johnson knotters. From here it goes to a four-stage brown stock washing system consisting of four 11½-ft. diameter by 14-ft. face washers with auxiliary equipment and a vacuum (drum-type) saveall. The washers are driven by 15-hp motors.

The pulp from the third brown stock washer is stored in an unscreened stock chest lined with an epoxy base resin. The unscreened stock chest has a vertical agitator equipped with 10-ft. diameter adjustable pitch blades mounted on a vertical pipe shaft. It also has small adjustable blades that prevent the pulp from settling out at the bottom of the tank.

Between the third and fourth washers pulp is screened in two Mark "A" primary screens and one "junior" secondary screen capable of handling 250 tons of air dry stock. The Mark "A" screens are equipped with 75-hp motors, while the "junior" screen is driven by a 40-hp motor.

From the fourth washer the accepted pulp is conveyed on a 24-in. belt to two 32-ft. diameter by 50-ft. high-density storage tanks, each equipped with four oscillating high-pressure mining nozzles for pulp removal.

The high-density storage tanks are equipped with 36-in. propeller agitators.

Stock preparation

The stock preparation system includes three 42-in. double-disc refiners driven by 700-hp motors, three Majestic 400-hp jordans, two consistency regulators handling stock from the high-density storage tanks ahead of the refiners and jordans, and refiner and machine stock chests equipped with three 72-in. diameter horizontal propeller agitators. Three additional consistency regulators handle stock from the refiner and machine stock chests.

The jordans are arranged for maximum versatility—to provide stock for a variety of products and also, simultaneously, for the primary and secondary headboxes if desired.

The paper machine

A 40,000-gpm ACAP fan pump driven by a 500-hp motor pumps the stock to the airloaded inlet-headbox combination.

The 262-in. wire fourdrinier, with a speed range of 250-2000 fpm, has two headboxes, eight stainless steel suction boxes, a 28-in. diameter rubber-covered lump breaker roll and a 54-in. diameter suction box couch roll.

The press section consists of two rubber-covered 40-in. suction presses and a hard rubber-covered 34-in. diameter smoothing press. The smoothing press acts as a lead-on to the four-section dryer line.

The dryer section contains fifty 60-in. paper dryers and fourteen 60-in. felt dryers designed for a maximum steam pressure of 125 psi.

A 34-in. diameter breaker stack is located between the second and third dryer sections and a 34-in. diameter size press between the third and the fourth dryer sections.

There are two open-side, eight-roll calender stacks separated by four 60-in. diameter dryer rolls. A constant-speed Autoflyte reel and a Model A winder, capable of producing 72-in. diameter rolls and operating at speeds up to 5000 fpm, complete the paper machine installation.

A Broke Master equipped with two Lo-Speed rotors, driven by 150-hp motors handles the broke from the paper machine.

A roll conveyor is installed between the winder and scale for conveying heavy paper rolls. This conveyor, a shuttle tracks-and-carts type, is designed to handle the rolls at a minimum of effort on the part of the operators. The shuttle carts run on four wheels with precision bearings, giving long life under heavy loads. The shuttle track is imbedded in the concrete floor. It is of heavy-duty design to withstand the imposed loads of large fork trucks crossing over the tracks.

Paper machine drivers

The paper machine is driven by sectional electric drives that derive their power from two 1500-hp generator sets. The winder is driven by a separate dc drive unit equipped with two breaking generators and drive motors of 300 hp each.

Air system

The exhaust section of the air system consists of wet end exhaust, machine hood and exhaust, and calender dryer hood and exhaust. Air supply units include roof supply (to prevent condensation), felt drying, calender cooling and Grewin-type vapor absorption. The complete two-machine room air system handles approximately 900,000 cu. ft. of air per minute.

The air supply system in the pulp plant includes a hood and exhaust system for the brown stock washer and air supply for the electrical room.

The recovery system

Black liquor from the weak liquor storage tank is pumped to the septuple-effect evaporators that concentrate the liquor to 55-per cent solids content. These evaporators are of Swedish design and the first of this type to be used in the United States.

Concentrated liquor is pumped from the concentrated liquor storage to the bottom of a precipitator.

The precipitator is designed to handle 120,000 cfm of fuel gases and recovers approximately 35 tons per day of entrained sodium sulfate from these gases. The precipitator is a double-chamber unit, each chamber being composed of two fields. The precipitator field is a section of the unit with gas passages or ducts bounded by flat steel collecting electrodes 16 ft. high.

The discharge wires, collecting electrodes and gas distribution plates are rapped periodically by timer-controlled pneumatic rappers to dislodge the collected salt cake. This material falls into ponds of black liquor beneath the precipitation zones. The black liquor is then pumped to the cascade evaporator. From the cascade evaporator concentrated black liquor is pumped to a recovery unit that operates at a pressure of 600 psi at the superheater outlet and a total steam temperature of 750°F. The recovery unit is equipped with a decanting hearth, tangential over-fire air, tangent-type superheater, furnace screens, baffleless boiler design and a tubular evaporator located at the economizer outlet.

Smelt from the recovery furnace is dissolved and pumped to the recausticizing system. The recausticizing system consists of one No. 8 slaker, three No. 11 causticizers, one 40-ft. diameter by 14-ft. Type A special white liquor clarifier, one 40-ft. diameter by 14-ft. AX lime mud washer, one 30-ft. diameter by 24-ft. ATO combination green liquor clarifier, one 7-ft. by 6-ft. dregs mixer, one 16-ft. by 10-ft. Type A dregs washer, one 16-ft. diameter by 16-ft. AP lime mud storage agitator, four No. 4 diaphragm slurry pumps made of stainless steel and three No. 2 diaphragm slurry pumps made of cast iron.

Lime is burnt in an 8- by 250-ft. lime kiln. It is driven at 1.5 rpm maximum by a 50-hp motor drive through Dynamatic coupling.

Steam supply

In addition to the recovery unit there is a power boiler rated at 150,000 lb. steam/hr. operating at a pressure of 350 psi. It is a pressure-fired unit equipped with front-fired burners, baffle boiler section and a Ljundstrom air preheater. The basic design of this unit incorporates features so that at a future date the operating pressure of the unit can be increased to 600 psi and a total steam temperature of 750°F.

Feed water is supplied to the boilers by two feed water pumps. One of the pumps is driven by a steam turbine, the other by an electric motor. The feed water system features filters, Zeolite softeners, hotwell and vertical deaerating heater.

W. J. Shelton
V. P. & Res. Mgr.

E. E. Archibald Jr.
Gen. Supt.

E. Ericksen
Supt. Raw Mts.

A. H. Jones
Controller

W. H. Youngchild
Paper Mill Supt.

W. E. Ross
Pulp Mill Supt.

A. D. Anderson
Plant Engr.

P. Logan
Electr. Supt.

Principal equipment installed at Georgia Pacific's Toledo Mill

Chip handling

Belt conveyors (2), one 260-ft. and one 100-ft., 30-in. wide ..... Link-Belt Co.
Chip blower driven by 300-hp motor, 140 tons/hour capacity ..... General Electric Co.
Motors ..... General Electric Co.
Pneumatic conveyor system ..... Rader Pneumatic Inc.
Rotary plate feeders (2), one 12-ft., one 17-ft. dia. ..... Link-Belt Co.

Pulp mill

Air compressor (1), 100-hp, PHE ..... Ingersoll-Rand Co.
Blow heat recovery system ..... A. H. Lundberg (Designer)
Brown stock washers (4), vacuum type, 11½-ft. diameter by 14-ft. face, driven by 15-hp motors ..... Door-Oliver Inc.
Brown stock washer hood and exhaust system ..... J. O. Ross Engineering Corp.
Digesters (4), carbon steel, 4650-cu. ft. capacity each ..... American Pipe & Construction Co.
Digester bottom fittings, 10×8 reducing elbows, with 4-in. heel outlet and flanges, ESCO alloy 45S ..... Electric Steel Foundry Co.
Heat exchangers, spiral type ..... Rosenblad Corp.
High-density pulp storage tanks (2), 100 ton-capacity ..... American Pipe & Construction Co.
Johnson knotters (3) ..... Door-Oliver Inc.
Screens (3), two Cowan Mark A, centrifugal, driven by 75-hp motors, and one Junior screen ..... Appleton Machine Co.
Stock pumps (2), driven by 400-hp motors ..... Goulds Pumps Inc.
Tripper ..... Link-Belt Co.

Paper mill

Air compressor (1), 100-hp, PHE ..... Ingersoll-Rand Co.
Air system, exhaust and supply, 900,000 cu. ft./min. capacity ..... J. O. Ross Engineering Corp.
Brokemaster, equipped with Lo-speed rotors .. E. D. Jones & Sons Co.
Calenders (2), eight-roll ..... Black-Clawson Co.
Condensate system ..... Ross Midwest Fulton Corp.
Consistency regulators (5), pipeline type, two handling stock from high-density stock tanks and three handling stock from board and paper refiner chests ..... De Zurik Corp.
Cranes (2), one 50-ton and one 25-ton capacity ..... Ederer Engineering Co.
Dryer section, 64 cylinders of 60-in. diameter ..... Black-Clawson Co.
Fan pump (1), ACAP, 40,000-gpm capacity .. Allis-Chalmers Mfg. Co.
Headboxes (2), one air-loaded inlet combination, one secondary for top dressing on linerboard ..... Valley Iron Works Co.
Instrumentation ..... Foxboro Co.
Jordans (3), Majestic, driven by 400-hp motors ..... E. D. Jones & Sons Co.
Lift truck (1), 10,000-lb. capacity, with Cascade roll grab ..... Yale & Towne Mfg. Co.
Lift trucks (2), 4000-lb. capacity ..... Clark Equipment Co.
Lowerator (1), 7-ton capacity, semi-automatic .... American Mfg. Co.
Motor-generators (2), 1500-hp ..... General Electric Co.
Motors, electric ..... General Electric Co.
Paper machine, cantilever design, 262-in. wide, 2000-fpm ..... Black-Clawson Co.
Presses (3), two suction 40-in. diameter rolls, one smoothing press, 34-in. diameter rolls ..... Black-Clawson Co.
Pumps, general ..... Goulds Pumps Inc.
Reel (1), Autoflyte ..... Black-Clawson Co.
Refiners (3), Double-D, 42-in., driven by 700-hp motors ..... E. D. Jones & Sons Co.
Roll conveyor, shuttle trucks and carts .... Lamb-Grays Harbor Co. Inc.
Roll covers .... Huntington Rubber Mills Inc., Griffith Rubber Mills
Saveall (1), vacuum, 8-ft. diameter by 16 ft., rubber-covered with stainless steel 16-ft. feedbox and conveyor repulper ..... Dorr-Oliver Inc.
Sectional electric drives ..... General Electric Co.
Size press (1), 34-in. diameter rolls ..... Black-Clawson Co.
Tile linings, in couch and wire pits ..... Chemical Linings Inc.
Vacuum pumps ..... Nash Engineering Co.
Winder-slitter, Model A, 5000-fpm ..... Black-Clawson Co.

Chemical recovery

Evaporators, septuple effect ..... Rosenblad Corp.
Evaporator instrumentation ..... Bailey Meter Co.
Electrostatic precipitator, wet bottom, double-compartment, completely automatic ..... Koppers Co. Inc.
Lime kiln (1), lined with 6-in. thick brick, 8-ft. diameter by 250 ft. long, equipped with adjustable-speed dynamatic drive ..... Allis-Chalmers Mfg. Co.
Lime kiln conveyor and elevator ..... Link-Belt Co.
Lime kiln instrumentation ..... Bailey Meter Co.
Plug valves, eccentric, ni-resist, for handling black liquor ..... De Zurik Corp.
Pumps, with open-face impellers ..... Western Machinery Co.
Recovery boiler (1), operating at 600-psi pressure and 750° F ..... Combustion Engineering Inc.
Scrubber, on kiln ..... Peabody Engineering Corp.
Steel tanks ..... American Pipe & Construction Co.
Recausticizing system, consisting of a No. 8 slaker, three No. 11 causticizers, a 45-ft. diameter Type A white liquor clarifier, a 40-ft. diameter AX lime mud washer, a 30-ft. diameter ATO green liquor clarifier, a 7-ft. × 6-ft. dregs mixer, a 16-ft. by 10-ft. Type A dregs washer, a 16-ft. diameter AP lime mud storage agitator, four No. 4 diaphragm slurry pumps, and three No. 2 diaphragm slurry pumps ..... Dorr-Oliver Inc.

Steam and power

Boiler (1), 150,000-lb./hour capacity, designed for 600 psi pressure ..... Combustion Engineering Inc.
Feedwater system, filters, zeolite softeners, hotwell and vertical deaerating system ..... Graver Water Conditioning Co.
Feedwater pumps (2), one operated by steam turbine, the other by electric motor ..... Worthington Corp.
Instrumentation, metering and control equipment .... Bailey Meter Co.
Oil storage tank, 40,000-barrel capacity ..... American Pipe & Construction Co.

Water supply

Chlorinator (1), A-711, 250-lb. chlorine per day capacity ..... Wallace & Tiernan Inc.
Pumps (2), 6000-gpm, one electric- and one diesel-operated .... Peerless Pump Div., Food Machinery & Chemical Corp.
Pumps, general ..... Goulds Pumps Inc.
Water tank, 600,000-gal. capacity .. American Pipe & Construction Co.

General

Agitators, on chests, etc. ..... James Brinkley Co.
Airveyors for lime and salt cake handling ..... Fuller Co.
Crane (1), for shop use, 50-ton capacity ..... Ederer Engineering Co.
Fittings ..... Grinnell Co. Inc.
Roll grinder (1), two-wheel, swing-rest type, 42-in./60-in. by 316, mounted on Korfund isolators ..... Farrel-Birmingham Co. Inc.
Stock control valves, three-way, four-way, and vee-port ..... De Zurik Corp.
Valves (200), Saunders diaphragm, ½-in.—6-in., on compressed air lines, stock drain lines, control applications, etc. ..... Grinnell Co. Inc.
Valves, lead-lined, handling sulfuric acid from storage tanks ..... Grinnell Co. Inc.
Valves (30), control valves used in black liquor, evaporators, recovery plant, brown stock washing, blow heat recovery, steam and water services .... Mason-Nielan Div., Worthington Corp.

The use of pipe, fittings, valves and pumps in the pulp and paper industry

ROLAND L. ALLEN JR.
Vice President
Eastern Engineering Co.

Part I (Cont.)—Discussion of available materials: pipe and fittings

▶ Part I in this issue discusses such materials as Kralastic, hard rubber, Duriron, glass, lead, clay, concrete and other piping materials.

Kralastic plastic pipe and fittings

Still another plastic material available in the form of pipe and fittings is kralastic. This material has many of the qualities attributable to polyvinyl chloride and polyethylene pipe, but is a rigid material like unplasticized polyvinyl chloride and not flexible like polyethylene.

Kralastic pipe is readily available in sizes from ½ in. through 6 in. and can be obtained in sizes through 12 in. for some wall thickneesses. The wall thicknesses include 75-, 100-, 125- and 150-lb. working pressure and schedules 40 and 80. The schedules 40 and 80 have outside and inside diameters corresponding to those for carbon steel pipe. The other wall thicknesses available do not have inside and outside diameters corresponding to those for carbon steel pipe.

Fittings are available for kralastic pipe in sizes ½-in. through 6-in. and are obtainable in screwed and solvent welding types.

The information given for polyvinyl chloride pipe regarding cutting, supporting, expansion and temperature is applicable to kralastic pipe.

Hard rubber pipe and fittings

Hard rubber pipe and fittings have been used for a number of years in the pulp and paper industry. Although it is still a very satisfactory material for a number of services, its use has been decreased in recent years due to the decreased use of the plastic piping materials.

Hard rubber pipe is made in sizes ¾-in. through 8-in. with outside diameters corresponding to carbon steel pipe. However, the inside diameters do not correspond to any of those for carbon steel pipe because the wall thickness is somwhat heavier.

Fittings are normally available in sizes ¾-in. through 4-in. with larger fittings fabricated on special order.

Hard rubber pipe and fittings are available that are made from several rubber compounds that are specifically suited for use in various service conditions. Some compounds are available that are suitable for service temperatures of over 200°F.

Hard rubber pipe can be cut and threaded with ease using the tools and methods recommended by the manufacturer. It should be supported very frequently or continuously.

Points that must be considered for using plastic and hard rubber pipe

Although the plastic and hard rubber piping materials offer many advantages, they have some disadvantages.

Probably the most important of these disadvantages are the low strength and vulnerability to thermal damage that these materials have in comparison to metallic materials. For instance, their tensile strength is about 10 to 20 per cent of that of carbon steel, and they flow or distort at temperatures of about 150 to 275°F.

Therefore, they are easily damaged by external abuse such as impact and contact with weld splatter from metallic objects being welded in the vicinity.

Care should be exercised when locating these types of piping to protect them from mechanical damage and to assure that no damage will result from excessive temperatures of surrounding objects.

Duriron pipe and fittings

Pipe and fittings obtainable from Duriron Co. are made in two alloys. Both are high silicon-iron alloys. They are Duriron and Durichlor. The Durichlor alloy is the same as the Duriron alloy except that 3 per cent molybdenum is added.

Both alloys are made in bell and spigot and split flanged types of pipe and fittings and are obtainable in sizes 1-in. through 6-in. from stock. Larger sizes (8, 10, 12 and 15 in.) are made on order.

Duriron and Durichlor can be

welded if the recommendations of the manufacturer are closely followed.

These alloys are not extensively used in pulp and paper mills, but there are some applications, such as laboratory and process chemical drains and some of the chemical services, where they are used to a limited extent.

Glass and glass-lined steel pipe and fittings

Both pipe and fittings are available in glass and glass-lined steel forms. We will discuss glass pipe and fittings first.

A line of glass pipe and fittings is manufactured by Corning Glass Works, Corning, N.Y., under the name of Pyrex brand "Double-Tough" glass pipe and pipe fittings. This pipe is made in 1-, 1½-, 2-, 3-, 4- and 6-in. sizes in the following stock lengths: ½, 1, 1½, 2, 2½, 3, 4, 5, 6, 7, 8, 9 and 10 ft.

An attempt should be made to use only the stock lengths, but if non-standard lengths are needed they can be supplied by the manufacturer on order. For best results glass pipe should be bought in the exact lengths needed; but, if this is not practicable, glass pipe up to 3 in. in diameter may be cut to the required length and beaded or "flanged" on the job. This should be done by using materials and methods recommended by the manufacturer.

The glass fittings are made in the same range of sizes as the pipe. Available fittings include 22½-, 45-, 60- and 90-degree elbows, concentric reducers, 90-degree reducing elbows, tees, reducing tees, caps, crosses, return bends and 45-degree laterals.

Joining of pipe and fittings is effected by special ferrous flanges produced for use with glass pipe.

Glass pipe and fittings will withstand continuous operating temperatures up to 250°F without any special precautions. If protected from thermal shock it can be used in services up to 450°F. Below is a table giving the manufacturer's maximum recommended working pressures and maximum sudden temperature differentials for the various sizes of glass pipe.

Pipe Size	Maximum Recommended Working Pressure	Maximum Sudden Temp. Differential
1"	50 psi	200°F
1½"	50 psi	200°F
2"	50 psi	200°F
3"	50 psi	200°F
4"	35 psi	175°F
6"	30 psi	160°F

Glass pipe can be supported with the same pipe hanging and support devices used on other types of pipe, except that suitable padding must be added between the pipe and the support. Where glass pipe is located so that it is subject to mechanical damage, it should be protected by suitable enclosures or guards made from sheet metal, expanded metal, etc. While glass piping is subject to breakage, it is surprisingly tough and will withstand much more abuse than would seem possible.

For applications above the size range of glass pipe or for services where the strength of glass pipe is too low, glass-lined steel pipe and fittings may be used. Glass-lined steel pipe and glass-lined cast iron fittings are available from other sources in a fairly wide range of sizes. Normally, glass-lined steel pipe is available in sizes through 12 in. in 10-ft. flanged lengths. Any length shorter than standard is made to order. For sizes above 12 in. and for piping of any size where it is desirable to eliminate some of the flanged joints in the piping system, it is a good idea to prefabricate the system from carbon steel pipe, flanges and fittings of appropriate weight and in convenient sections and then glass-line each section. The prefabrication of the steel pipe sections must be performed in accordance with the needs of the manufacturer that does the glass-lining, and therefore it is generally more convenient to place the entire responsibility in the hands of the glass-lining vendor and have him supply and fabricate the steel piping as well as apply the glass lining.

The glass lining material should be selected to give the properties required for the particular service.

Care should be exercised to assure against damage to the glass lining, and absolutely no welding on the steel pipe should be allowed. Assembly, erection and support of the glass-lined piping should be in accordance with the recommendations of the manufacturer.

The glass lining should be electrostatically tested to detect pin holes.

Lead and lead-lined steel pipe and fittings

Lead pipe and lead-lined steel pipe have never been used in great quantity in the pulp and paper industry, but these materials have been used with much success in several "hot spots" such as alum and wet chlorine service.

Lead pipe is normally made in sizes from ½-in. inside diameter through 12-in. inside diameter, but other sizes can be made on order. The inside diameter sizes normally made are: ¼-, ⅜-, ½-, ⅝-, ¾-, 1-, 1¼-, 1½-, 1¾-, 2-, 2½-, 3-, 3½-, 4-, 4½-, 5-, 5½-, 6-, 7-, 8-, 10- and 12-in. Sizes ¾-in. through 12-in. inside diameter are normally made in six wall thicknesses (⅛-, 3/16-, ¼-, 5/16-, ⅜- and ½-in.). Sizes ½-in. and ⅝-in. inside diameter are normally made in five wall thicknesses (⅛-, 3/16-, ¼-, 5/16- and ⅜-in.). Sizes ¼-in. and ⅜-in. inside diameter are normally made in four wall thicknesses (1/16-, ⅛-, 3/16- and ¼-in.). Other wall thicknesses can be made to order.

Lead pipe is made from several grades of chemical lead. The most common grades are antimonial lead, tellurium lead, tellurium-antimonial lead and plain chemical lead. The grade of lead that will give the best service in the particular set of conditions should, of course, be used. The lead pipe manufacturer can be of assistance in the selection of the grade best suited for the conditions.

Lead pipe is ductile, and for this reason there is very little need for lead fittings. Almost any piping system can be fabricated from lead pipe without the use of fittings. Hard lead flanged fittings are available in sizes ¾-in. through 12-in. made to the same dimensions as 125-lb. cast iron flanged fittings in accordance with ASA B16.1.

Lead pipe is easily cut with almost any type of cutting tool. It can be joined by welding or "burning" when trained personnel using the proper tools and materials are employed. It must be emphasized that highly skilled mechanics with long experience are required for a good job of "lead burning". This operation is not soldering, but fusion of the parts using an oxy-hydrogen torch. Most plumbers are experienced in soldering lead for sanitary waste systems, but few are experienced in "burning" chemical lead. Be sure to get an experienced "lead burner" for your work.

For applications calling for lead where more rigidity and strength to withstand pressure, vibration and mechanical abuse are required, lead-lined steel pipe and lead-lined cast iron and steel flanged fittings are available.

Lead-lined steel pipe is available in two types of lead lining with the lead being any of the grades mentioned above for lead pipe. The first type is with the lead lining actually bonded to the steel pipe. The second type is with the lead lining expanded within the steel casing to obtain tight metal-to-metal contact.

(Continued on Page 210)

New products and new raw materials for the paper industry*

WILMER E. HANSEN
Supervisor of Merchandising
Electrical, Non-woven Structures,
and Synthetic Papers
Textile Fibers Department
E. I. du Pont de Nemours & Co. Inc.

Synthetic fibers are a raw material that provides the paper engineer with the tools to find new markets or to provide papers that will better serve the markets for a variety of special applications.

PAPERS MADE from nylon, Dacron polyester fiber and Orlon acrylic fiber will find use in some areas dominated by fabrics. They will also find use in areas that we now think of as paper end uses.

How will fibers that cost as much as $1.40 per pound ever find use in paper? While we do not visualize that products such as newspapers or shopping bags will be made from papers of nylon, Dacron and "Orlon", papers made from these fibers alone or in combination with wood pulp, rope or abaca do satisfy the requirements of many applications that can justify their cost. These new basic raw materials provide the paper engineer and the salesman with the tools to find new markets for paper or provide papers that will better serve markets where the current product is not completely satisfactory.

Work with nylon, Dacron and Orlon fibers has been aimed at providing the papermaker with a product that he can use on his present equipment. When these fibers are used in blends with wood pulp, little or no modification to current equipment is necessary. If, on the other hand, 100-per cent synthetic fiber papers are to be made, some modifications are necessary. These modifications are related to the method of depositing the fibers on the wire and a system for applying resins to the newly-formed sheet. Resin bonding is necessary with 100-per cent synthetic fiber papers in order to bond the fibers together and consolidate them into a sheet. Unlike wood pulp fibers, synthetic fibers do not swell and cohere to each other sufficiently. Therefore, a chemical resin binder must be used.

Properties imparted by synthetic fibers

A wide variety of properties can be engineered into papers of 100-per cent synthetic fiber as well as paper made by blending synthetic fibers with the conventional papermaking fibers. Let us take a look at these basic materials, i.e., the fibers and resins with which we have worked and the properties that can be incorporated in the papers by using these fibers.

First, nylon, Dacron polyester fiber and Orlon acrylic fiber can be cut to any length desired from ⅛-in. up. Further, they can be furnished currently in a wide variety of fiber cross sectional areas from fine fibers of three denier to heavier fibers of 15 denier. While there are some practical limitations in the fibers that can be furnished today, there is no reason why any length cut in any desired cross sectional area cannot be manufactured in the future to satisfy the demands of the paper process or the end use requirements for the paper.

As you know, each of these fibers has its own specific characteristics that distinguish it from the others. Nylon is a strong, tough flexible fiber that gives you the most strength and toughness per unit cost.

Orlon acrylic fiber has fine aesthetic properties, good chemical resistance, excellent outdoor durability and the highest bulk of the three fibers. Its tensile strength is lower than that of nylon and Dacron polyester fiber.

Dacron has the greatest stretch resistance, absorbs the least amount of moisture, can withstand higher temperatures and under exposure to heat and moisture is the most dimensionally stable Du Pont fiber.

Mildew does not weaken these fibers, and insects do not have an appetite for them. When the fibers are subjected to 95-per cent humidity at 70° F, Dacron absorbs the least moisture—0.5 per cent as compared to 8 per cent for nylon and 27 per cent for rayon. All of our polyfibers are quick-drying. In addition, variations in temperature and humidity have little or no effect on the dimensions of Dacron.

Properties imparted by binders

In the case of 100-per cent synthetic fiber paper, the final properties will depend on the fiber used and the selection of a chemical binder. The wide variety of elastic and hard binders available permits the paper to be rubbery or stiff or more like a fabric or felt than a paper.

Our investigation of the various binders has led us to observe that there is no single resin that can be considered as an "all-around" general purpose binder. Some of the polyvinyl acetate binders give a good balance of tensile, tear and burst strength with all three fibers. On the other hand, these same papers are generally inadequate in wet strength and are not strong at elevated temperatures. Therefore, papers bonded with PVA do a good job when their use is limited to dry conditions at moderate temperatures.

Elastomeric binders, including neoprene, were investigated. Some of these elastic binders have been useful in producing softer, more pliable papers. These papers also had other significantly good properties; for instance, many of the elastic binders used produced good tear strength. Papers made using this family of binders may be useful to produce pliable papers with good tear strength

*Abridged from a paper presented at a meeting of the Salesmen's Association of The Paper Industry, April 23, 1958.

for coated uses such as luggage or pocketbooks.

Our investigation of acrylic-based binders has shown that a stiff, snappy paper can be produced that has shown excellent dimensional stability in the presence of varying conditions of humidity and temperature. Papers of Orlon acrylic fiber bonded with this resin show very good outdoor durability and resistance to filtration or in outdoor applications where resistance to ultra-violet rays is important.

There are many more resins available for examination, but basically the binder and the fiber selection must be made after studying the specific properties known to be important to the end use under consideration. In addition, price must be considered. Resins vary considerably in price, and here again the end use will influence the choice of binder.

Resin binder is the limiting factor; quantities used

In all of the 100-per cent synthetic fiber papers made to date, the resin binder has been the limiting factor. The binder fails prior to failure of the fiber. This has not permitted the full utilization of the high-strength properties of the synthetic fibers. Research work is continuing within the resin manufacturing companies and Du Pont to find binders that will allow stronger papers to be made from nylon, Dacron polyester fiber and Orlon acrylic fiber.

To achieve reasonable physical properties it is necessary to incorporate at least 15-per cent binder based on the weight of the sheet. With the addition of a greater percentage of binder—for instance, polyamide binder with nylon fiber—tensile strength and bursting strength continue to increase. Addition of binder above about 40 per cent causes a film-like structure to be formed with attendant reduction in tear and burst properties.

Wet-strength resins at reasonable resin concentrations have not been shown to be as effective as other binders. Since these binders are normally applied as a beater additive, only a small amount of the resin is retained in the formed sheet. This amount of resin retained did not improve the strength of paper made from nylon, Dacron polyester fiber or Orlon acrylic fiber to a useful level.

Wood pulp and synthetic fiber blends

Because synthetic fibers do not bond with wood pulp in the presence of water, once again we cannot take advantage of the strength of synthetic fibers in papers made by blending wood pulp with nylon, Dacron or Orlon. It is true that a chemical bond can be used in the same manner as we do with 100-per cent synthetic fiber papers to increase tensile strength, but this could no doubt be done just as economically by increasing the basis weight of the all-cellulosic paper.

However, some unique functional properties can be achieved by the addition of synthetic fibers to wood pulp when a resin is used.

Fold endurance is an outstanding example of the contribution made by nylon and Dacron. With the addition of these fibers in 50/50 blends with wood pulp, the fold endurance is increased hundreds of times. Tear strength is improved in direct proportion to the amount of Dacron or nylon present.

It is easy to visualize several applications such as maps, charts and book covers where fold endurance and tear strength are important property contributions.

Wet strength of synthetic fiber blends is improved over that of 100-per cent cellulosic papers. Further, the addition of nylon and Dacron polyester fiber increases the water permeability of the sheet. This combination of wet strength and higher throughput will satisfy many filtration applications. Of interest to papermakers also is the fact that increased water permeability also improves processing on the paper machine since it is reflected in increased drainage rate during paper formation.

Bursting strength, softness and the strength of stitched or sewn seams are increased significantly by blends of synthetic fibers. All of these may be useful properties that will complement wood pulp papers and give them the extra performance to hold old markets or gain new markets.

Uses of synthetic papers

With the laboratory information available, we have speculated on the end uses of these products. Immediately you think once again of that $1.40 price, and you realize that these products must perform far better and longer than the structures now used. This leads us to consider the products where the special properties we have discussed could be useful on a cost/performance basis.

We have considered applications where dimensional stability might be important. Some of the uses that come to mind here are printable papers, tracing cloth, chart paper and photographic products. When we combine heat resistance by the selection of the appropriate fiber, this leads us to think of industrial applications such as electrical uses. We know that the electrical industry is searching for insulating materials that will withstand higher temperatures, with good insulating properties. Papers of Dacron polyester fiber will provide the electrical manufacturer with a substrate that is insensitive to moisture, has a low power factor and can be used at higher operating temperatures.

The openness that can be achieved with blends of wood pulp and synthetic fiber in papers should indicate uses in filtration because greater throughput will be possible. Coupling this with the chemical and heat resistance offered by synthetic fibers, an outstanding filter paper may be obtained.

Many tagging and tabulating cards require good printability along with dimensional and thermal stability. Labels made from blends of wood pulp and synthetic fibers are excellent candidates for use where the product to which the label is attached encounters severe conditions.

Papers with the outstanding fold endurance contributed by blends of wood pulp and synthetic fibers can find use in charts, maps and books where flex life is important. For these uses excellent flex life can be combined with tear strength and general toughness.

Chemical resistance, thermal stability and the improved abrasion resistance of synthetic fiber-wood pulp papers point to the possibility of using these materials for gaskets. The gaskets would possess these characteristics and have good conformability and compressibility.

Fabric-like structures made on paper machines may find application as substrates for coatings, impregnations and films. Here the number of films that require improved tensile, tear and burst properties are a catalog of materials to themselves. Paper of 50 per cent Dacron polyester fiber and 50 per cent cellulose have been coated with vinyl, and the resultant structure possesses the same tear strength as a coated cotton sheeting. Tensile strength of the coated product was nearly doubled when compared to the tensile strength of coated 100-per cent cellulosic paper.

While it is true that we have not yet seen products that will replace the suiting, sweater or rug fabric, we do believe that these things will come about sometime in the future as technical effort continues. We can already see that the products now in hand have opportunity in findings, padding and felt-like materials for the clothing industry, where these products must perform a function such as providing strength, tear resistance, sewability or washability to the garments.

Important symposia at the 133rd meeting of the American Chemical Society

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THE AMERICAN CHEMICAL Society held its 133rd national meeting at San Francisco April 13-18. About 6500 chemists and chemical engineers were in attendance, and 22 divisions of the society were in session. Needless to say, no synoptical account of such a meeting can be attempted, and the present article will only give, very briefly, the results of three symposia that may be of direct or indirect interest to readers of THE PAPER INDUSTRY.

Wood as a chemical raw material

Under that genial chairman, Dr. Harry Lewis, vice president of the Institute of Paper Chemistry, the Division of Chemical Education met with the Division of Cellulose Chemistry, and the educators were introduced to wood as a chemical raw material. The availability of wood for chemical utilization was described by E. E. Matson of the Pacific Northwest Forest & Range Experiment Station, who showed that there were more than 100,000,000 tons of "wood residues" available to our chemical industries every year; that the manufacture of lumber and plywood produced 45,000,000 tons of such material, whereas the pulp industry could furnish 9,000,000 tons of potential organic raw materials. Lumbering wastes were the greatest of them all, but these were usually left to rot or were destroyed in slash fires.

The present uses of some of the more available residues were touched upon. At present their greatest "chemical" use is that of fuel. A very small amount of these residues is used in pulp mills and in structural fiberboard plants.

Dr. Arthur Anderson of the University of California gave a lucid resumé on the anatomical structure of woods and on their chemical composition. He was followed by A. W. Goos, research chemist for Cliffs-Dow Chemical Co. of Marquette, Mich. He spoke on the use of wood waste by means of destructive distillation. The present trend towards using wood charcoal in "grilling" food has increased; and the use of briquets, in which harmless binders like cornstarch are employed, have a favorable market. The limitations in the use of the tars and oils formed from hardwoods were discussed. Among those products which are refined and marketed are guaiacol, creosol, maltol and methylcyclopentenolene. Pine tar is the most important product of coniferous wood distilleries.

Dr. J. Saeman of the U.S. Forest Products Laboratory, speaking also for his colleagues, John Harris and E. C. Locke, spoke on chemicals produced from wood by treatment with catalytic amounts of acid. The kinetics of converting cellulose into sugar was discussed, as well as the production of hydroxymethylfurfural, which in turn is converted into levulinic acid and formic acid, all of which are co-products in the production of the sugars but which can also be produced without initially isolating such sugars. Dr. Saeman stressed the fact that the utilization of lignin should be the key to a practical over-all program. Such a venture is in progress at the Forest Products Laboratory in Madison.

Professor Felicetta, pinch hitting for Prof. Joseph McCarthy of the University of Washington, gave a clear outline of the separation of cellulosic materials by the various pulping processes, the nature and chemistry of which were discussed. Bleaching of pulps was also treated very briefly.

An excellent and well-illustrated lecture by Dr. Berwyn B. Thomas of the Olympic Research Div. of Rayonier Inc. described the production of chemical cellulose from wood. He discussed how this product must be purified to attain high levels of alpha-cellulose, with degrees of polymerization that varied depending on whether it was to be used in the manufacture of rayon, tire-cord, cellophane, cellulose acetate, cellulose nitrate or the cellulose ethers. Usually sulfite pulp or prehydrolyzed kraft pulps are employed, and meticulous purification is required.

Dr. W. M. Hearon of Crown Zellerbach Corp. (Camas, Wash.) spoke on the challenging problem of profitably utilizing pulping spent liquors. In the case of kraft black liquors, tall oil (some 300,000 tons separated in 1956) is an important byproduct. Controlled pyrolysis of the total black liquor gave rise to a good decolorizing carbon. Lignin (indulin) has also been isolated commercially and finds uses as a dispersing agent, as a reinforcing agent in the rubber industry and as an ingredient for certain resins. A very recent development lies in the production of dimethyl sulfide by heating kraft black liquor with sulfidic sulfur. This methyl sulfide is marketed as an odorant for gas, as an odor intensifier in certain perfumes and more especially as a raw material in various organic syntheses. Dimethyl sulfide can be converted economically into methyl mercaptan, which is used in the formation of methionine, an important nutrient. Sulfite spent liquor was also considered. At present its most important use is in the production of binders and dispersing agents, with about 100,000 tons of such products sold *per annum*. To a limited extent the sugars in the spent liquors form the raw materials for the production of ethyl alcohol and, in at least two plants, for the production of torula yeast. A more recent development in sulfite spent liquor utilization is based on its property of forming complexes with metals. Such a complex made with iron has been used agriculturally as a spray to overcome iron deficiencies in plants. However, all of these uses are extremely limited when we view the enormous volume of these spent liquors, and further research is imperative. It is the lignin components in the spent liquors that require this exploration.

It was to these lignins, as potential raw materials in the production of pure organic chemicals, that Dr. I. H. Pearl of the Institute of Paper Chemistry referred in his exposition. (Certain phases of the chemical utilization of lignin are also given by Dr. Pearl in THE PAPER INDUSTRY, April 1958, 30-31.) He stressed not only the production of vanillin from spent liquors, but also that of vanillic acid (prepared from vanillin) and the derivatives of this acid, like ethyl vanillate and the diethyl amide of the acid, which have found important uses in medicine and (in the former case) as a preservative. Actually, vanillin has been converted into hundreds of derivatives, many of which have already been evaluated for their end uses. With the advent of the sulfite pulping of hardwoods new problems have arisen. Syringyl groups (as well as the guaiacyl groups that form the basis of vanillin) have entered the picture.

Dr. L. M. Whitmore reported on his work and that of Messrs. Wiley and Boggs of the Sulfite Pulp Manufacturers League. He emphasized the renewed interest in the utilization of spent liquor carbohydrates and showed the necessity for long-term research by suitable "teams". This would involve special skills in chemical, in engineering and in marketing research. Some of the factors discussed by Dr. Whitmore had been referred to by previous speakers. The difficulties in finding specific commercial uses for pure sugars that can be isolated from the spent liquors (e.g. mannose, xylose and galactose) were mentioned, and new techniques for the preparation of "diacetone" sugars were discussed.

The naval stores and tall oil industries were ably reviewed by Dr. E. O. Barnes of Union Bag-Camp Paper Corp. He showed how the resin acids and the fatty acids of tall oil could be separated almost completely, and he also discussed the uses of sulfate turpentine. Studies have begun that should improve the yields of rosin and turpentine from specially selected trees that can produce more of these materials than do the present stands of pine.

Finally, Dr. William G. Van Beckum of Pacific Lumber Co. discussed the value of bark as a chemical raw material. Bark has often been used as fuel, but more recent studies led to methods for the isolation and identification of such bark constituents as quercetin, dihydroquercetin and waxes. Alkaline bark extracts undergo reactions with formaldehyde and may yield resins and adhesives, and certain bark (like that of western hemlock) are sources of tannin. By special treatments, Douglas fir, hemlock and redwood barks give extracts that are useful in oil well-drilling, ore flotation, ceramics and in a number of other fields.

Chemicals and chemical markets

Concomitant with the above meeting, another important symposium was in progress. This involved chemicals and chemical markets of the pulp and paper industry. Dr. William T. Sutphen of the Stanford Research Institute presided, and he introduced briefly the trends of that industry, stressing the importance of the pulp and paper industries to chemical markets. Even as long as four years ago the industry consumed nearly 300 million dollars worth of essential chemicals. A prognosis of western North America in pulp and paper production during the coming decade was then made by Dr. Sutphen's colleague, Dr. A. K. Beggs. (See the May 1958 issue of THE PAPER INDUSTRY.)

The present trends in pulp technology were outlined by Dr. J. D. Reagh Jr. of the Pulp Div. of Weyerhaeuser Timber Co. of Everett, Wash. Wood pulp capacity, which has been doubled within the past 10 years, owes this increase largely to kraft pulp (60% increase) and the advent of neutral sulfite semichemical pulp (23%). This trend will probably continue. Sulfite pulp production, which is nearly static, has been limited by such factors as suitable wood species, pollution abatement regulations, etc. Although ammonia- and soda-base sulfite digestions can pulp marginal wood species, heat- and chemical-recovery problems are still to be faced. Magnesia base sulfite pulping is now giving very good service and permitting rather effective magnesia recoveries in three North American mills. The value of neutral semichemical sulfite systems in pulping hardwoods, especially for corrugating medium, has become apparent. Present day bleaching chemicals continue to be chlorine and alkali, but an increase in the use of chlorine dioxide and of peroxide is indicated in the case of special grades of pulp. M. A. Brown of the New York offices of Rayonier Inc. defined the term "silvichemistry" as dealing with the study of complex organic chemical substances which occur in trees, or which may be derived from them. He excluded cellulose from his discussion. A number of these silvichemicals were mentioned, especially some of the newer ones found in or derived from spent sulfite liquors or from kraft black liquors. Last year silvichemical products, at producing points, were valued at $38,000,000.

The effect of a changing technology in the paper industry on chemical markets was presented by Dr. W. W. Moyer and Dr. James Wethern of Crown Zellerbach of Camas and read by the former. Their belief is that the paper industry itself will in time become a significant producer of chemicals. Today the paper industry shows a continuous demand for better sizes, wet- and dry-strength additives, and for coating adhesives—areas in which the chemical industry should take the initiative. The paper industry will also require synthetic films and fibers in obtaining certain desirable properties in specialty papers and in those used for packaging.

Finally, T. E. Maki of the Nitrogen Div. of Allied Chemical Corp. of Raleigh, N.C., showed what would be the probable role of fertilizers in forest management, especially in the Southeast and in the deep South, where there has been a gradual attrition of the original fertile acreage of the forests. His paper showed promising fertilizer uses and gave some preliminary estimates of their volume. He also gave the results of past experimental work in this field.

Chemical nature of wood and bark constituents

Of the three symposia, this final one on the Chemical Nature of Wood and Bark Constituents was fundamental and broad in its scope and was of marked interest to the writer. Its success was due largely to the energy and perseverance of Dr. Otto Goldschmid of Rayonier, who spearheaded the opening sessions, which then continued for two full days. Only a brief mention of these papers can be attempted.

The chemical nature and importance of extraneous components of wood were outlined by Louis E. Wise. The chemical nature of the extractives from red fir barks was discussed fully by Prof. Ervin Kurth, and this talk was based on his work at Corvallis and that of E. S. Becker. A paper on a color precursor isolated from western hemlock wood was presented by L. D. Hayward of the Department of Chemistry of the University of British Columbia. It represented his researches and those of Ursula Kramer-Fiedler and A. J. Finlayson. Then followed two excellent papers by Dr. J. A. F. Gardner and two colleagues at the same university (British Columbia). The first article dealt with the isolation and the intensive study of "plicatic acid" (a phenolic acid) from western red cedar heartwood, which indicated that this extractive was a polyhydroxylignan acid. The second paper by Gardner described a tropolone (β-isopropenyltropolone) present among the steam volatiles of the

outer butt heartwood of this same wood species. The tropolones (which contain seven-membered rings) are characteristic components of western red cedar. This compound was found to be identical with β-dolabrin, isolated from another wood (*Thujopsis dolabrata*) by a Japanese chemist. Dr. Gardner's verve and enthusiasm matched the ability with which he and his co-workers determined the constitution of this compound and also indicated how chemists in distant countries can cooperate with one another.

Dr. W. M. Hearon (Crown Zellerbach) then took his turn in presiding over the symposium, and Dr. E. Zavarin presented a very stimulating and highly technical paper on the extractive components of incense cedar heartwood. This was work done at the Forest Products Laboratory of the University of California jointly with Dr. A. Anderson. Formulations for the various compounds were given. They suggest that this is a new group of naturally occurring substances, possibly derived through the enzymic oxidative coupling from parent phenols of the *p*-cymene type.

The extractives of Sitka spruce were examined and identified by P. J. Kohlbrenner and Prof. Conrad Schuerch (of the State College of Forestry at Syracuse University) and discussed by the latter. An interesting extractive, among many others, was the unusual compound 2-octyl-β-sitosterol-phthalate, which was present in appreciable amounts in the ether-soluble fraction. It is possible that the presence of this compound may be specific for this coniferous wood.

The alkaline hydrolysis of 46 representative hardwoods was discussed ably by Dr. I. H. Pearl. This included the work of D. L. Beyer, S. S. Lee and Dawn Laskowski of the Institute of Paper Chemistry. Propanol extracts of these woods, when hydrolyzed, all gave vanillin, syringaldehyde, vanillic acid and syringic acid. Certain specific woods also yielded coumaric acid, *p*-hydroxybenzoic acid, ferulic acid and *p*-hydroxybenzaldehyde. Dr. Pearl discussed the occurrence of these compounds, their quantitative and qualitative relationships, and their possible relationship to other wood components.

The effects of chlorinating and oxidizing agents on oleic acid and triolein were studied by B. Leopold and D. P. Mutton, Industrial Cellulose Research Ltd. of Hawkesbury, Ont. The results that were reported by the former appear to be of interest in the removal of fatty extractives from wood pulps.

Dr. G. N. Richards, collaborating with Prof. Roy L. Whistler of Purdue University, presented work on the uronic acid fragments of the hemicelluloses of slash pine. An important structural acid component was 4-0-methyl-D-glucuronic acid, which was isolated largely as the disaccharide aldobiuronic acid. The former acid when treated at room temperature with lime water gave a dibasic acid (which was identified as the brucine salt). The corresponding aldobiuronic acid, subjected to a similar treatment, developed no further acidity. In conformity with other findings, it was shown, by determining the hydrolysis constants of several glycosides, that the glycosidic linkage is stabilized by the presence of the uronic acid group.

Dr. Gregory of Weyerhaueser Timber Co. then took over the chairmanship of the symposium. Dr. W. I. Lyness presented some extremely interesting work done in collaboration with D. L. Opdyke of Proctor & Gamble Co. on histochemical studies of constituents of slash pine bark and the location of the various components. Special stains were used that permitted the identification of phenolic bodies (including tannins), lignin, fats, suberin and starch.

Dr. H. L. Hergert of Rayonier presented a detailed study of the heartwood and bark constituents of longleaf pine and Douglas fir. He showed that the Klason lignins isolated respectively from the wood and from the bark resembled each other very closely and appeared to be chemically indistinguishable. The bark also contained certain "phenolic acids", which while very similar to bark tannins contained carboxyl groups (absent from the latter). Dr. Hergert then discussed the possible biogenesis of these components, suggesting that possibly the phenolic acid fraction resulted from the condensation of leucocyanidin near or at the inner-outer bark boundary.

Prof. Arthur Anderson, recently returned Fulbright Fellow from Norway, showed some beautiful pictures of the new forest research laboratories in that country. He described the influence of certain Scandinavian bark extractives on hardboard properties (in which bark had been used). The barks studied were those of spruce, pine and birch; all of these are sizeable waste residues in Norwegian logging industries. Anderson's researches indicated that when up to 50 per cent pine bark was used a board could be manufactured that had good dimensional stability, even when the usual sizing agents and heat treatment were omitted. Neither birch nor spruce barks manifested this auto-sizing action. The high wax content (1.2-1.7 per cent) of pine bark appeared to be largely responsible for this unique behavior.

That the Central Research Department of Weyerhaeuser Timber Co. is interested in quercetin (which is used pharmaceutically and as an antioxidant) was manifested by two papers, one by A. S. Ryan and another by L. E. Dowd. The former outlined a comprehensive review, and the latter gave a method for its spectrometric determination. The dihydroderivative is found in Douglas fir bark. A very interesting paper on the selective alkylation of polyhydroxyflavones (of which quercetin is one) was developed by Dr. Leonard Jurd of the Agricultural Research Service of the U.S. Department of Agriculture. This work represented fundamental organic chemistry and constitutional studies of the highest order.

That same afternoon a paper on soluble carbohydrates from the inner bark and the outer wood of ash, aspen and birch was read by Dr. Kyle Ward in the absence of the authors, Dr. R. E. Kremers and Barbara Reeder of the Institute of Paper Chemistry. This was folowed by another paper on free sugars and oligosaccharides in some California conifers given by L. V. Smith and Dr. Zavarin of the University of California. The outer and inner barks of incense cedar, redwood, ponderosa pine, Douglas fir, red fir and grand fir were examined, and it was found that the general pattern of carbohydrates in the inner bark and outer sapwood was distinct from that in the outer bark and the heartwood of these important western species. For example, fructose and sucrose, which were almost always present in the sapwood and inner bark areas, were invariably absent from the outer bark and heartwood of these trees. Glucose was almost universally present in all areas. Arabinose was found only in the outer bark and in four of the heartwoods. When raffinose or stachyose were present at all, they were found only in the sapwoods. Free xylose, rhamnose, and fucose were relatively rare and present only in the outer bark.

The growing interest in hemicelluloses of the coniferous woods, which impart such important properties to their respective pulps, became manifest in a succession of excellent papers. Prof. G. G. S. Dutton of the University of British Columbia examined the hemicelluloses of Sitka spruce (*Picea sitchensis*). Interestingly enough, he isolated a glucomannan (among other components) which contained about 90 per cent mannose

(Continued on Page 170)

Hardwood utilization by the chemigroundwood process*

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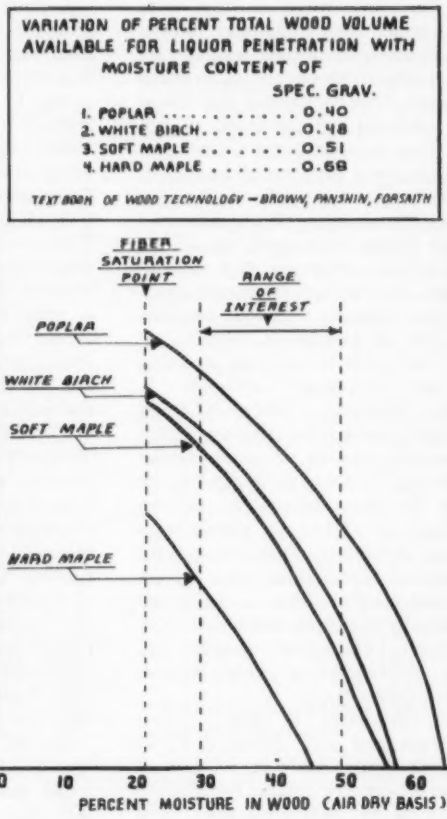

VARIATION OF PERCENT TOTAL WOOD VOLUME AVAILABLE FOR LIQUOR PENETRATION WITH MOISTURE CONTENT OF
SPEC. GRAV.
1. POPLAR 0.40
2. WHITE BIRCH. 0.48
3. SOFT MAPLE 0.51
4. HARD MAPLE 0.68
TEXT BOOK OF WOOD TECHNOLOGY — BROWN, PANSHIN, FORSAITH
FIBER SATURATION POINT
RANGE OF INTEREST
POPLAR
WHITE BIRCH
SOFT MAPLE
HARD MAPLE
PERCENT TOTAL WOOD VOLUME AVAILABLE FOR LIQUOR PENETRATION
0
10
20
30
40
50
60
70
PERCENT MOISTURE IN WOOD (AIR DRY BASIS)

▶ Some operating and cooking conditions now adopted at Great Northern's Millinocket chemigroundwood mill.

EARLY RESEARCH work showed that moisture and wood quality of pulpwood used in the chemigroundwood process played an important part in the quality of the cooked wood. Dense hardwoods, such as the maples and birches, necessarily had to contain less moisture before cooking than the less dense poplar to prevent burning of the logs. It can be seen from Fig. 1 that hard maple with 45 per cent moisture (A.D. basis) has no available space for liquor penetration—while soft maple, white birch and poplar have approximately 24, 30 and 43 per cent available space at this moisture level.

Wood with large amounts of heartwood produces inferior pulp. By separating the sapwood from the heartwood of cooked chemigroundwood and grinding each portion separately, differences as outlined in Table I were apparent.

From the data in Table 1, the following conclusions can be made:

1. **Physical strengths of heartwood pulp are much lower than those of sapwood pulp.**
2. **Brightness is approximately 17 points less in the heartwood pulp. This accounts somewhat for the latter's higher opacity.**
3. **The wet tensile of heartwood pulp is approximately one-half that of sapwood pulp.**

Wet storage of hardwoods in conical piles resulted in wood deterioration with no loss of moisture. Optimum conditions for storage of wet hardwoods above 30 per cent moisture (A.D. basis) necessitated tier piling with at least 3 ft. between piles. Dense hardwoods that averaged 20-22 per cent moisture (A.D. basis) could be charged directly to the digesters. Dense hardwoods cooked at 32-per cent moisture (A.D. basis) resulted in burned areas that lowered brightness and quality.

Poplar, a less dense hardwood, can be cooked at much higher moisture content than dense hardwoods. Poplar with as high as 45 per cent moisture (A.D. basis) has produced a high-quality chemigroundwood pulp.

The 400-ton capacity chemigroundwood plant

This plant consists of four vertical digesters with accompanying process equipment, such as heat exchangers, pumps, vacuum equipment, two vertical accumulators, complete white liquor system and conveyors and grapples for charging digesters and removing wood to grinding room.

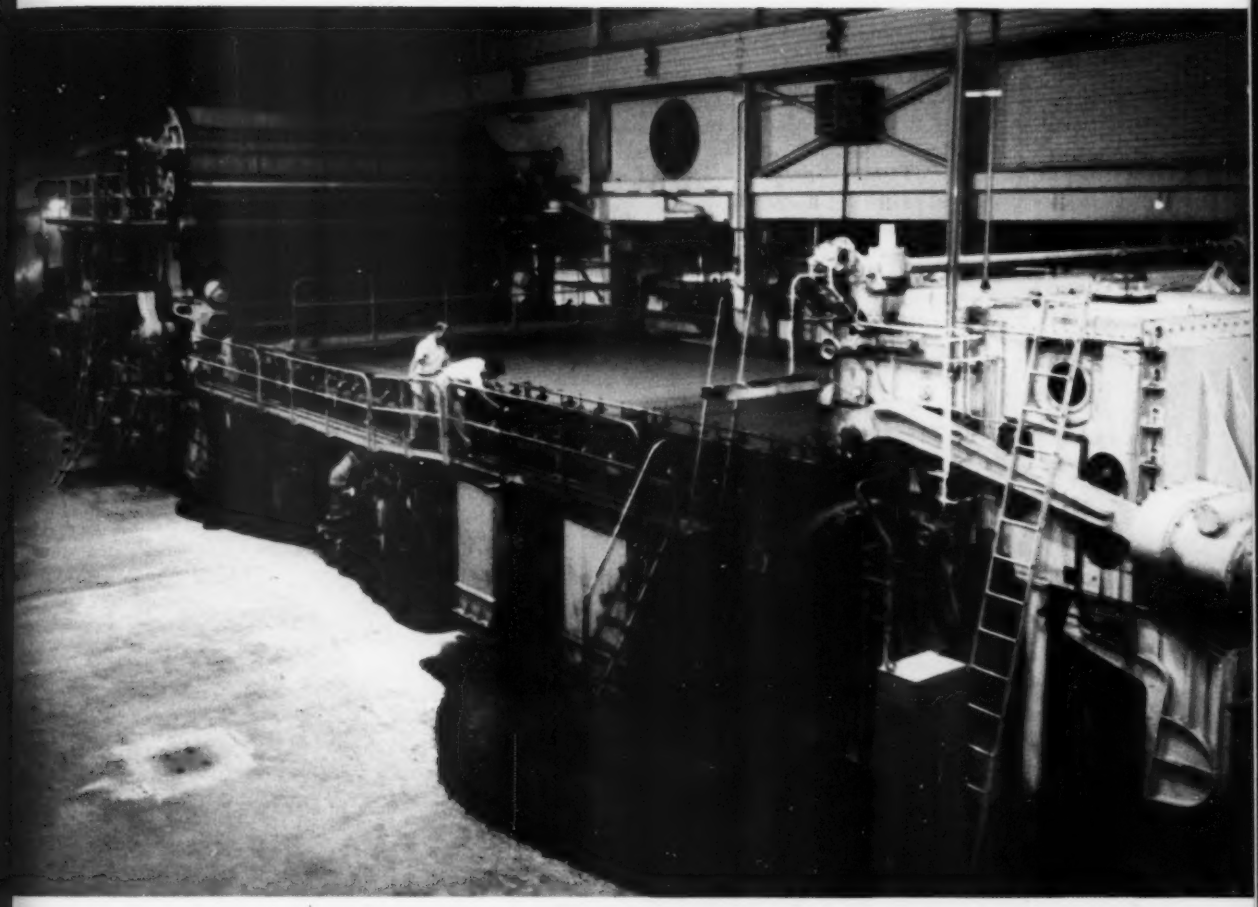
A streambarker was included in the original installation to remove the bark from cooked logs. Experimental cooks made on rough hardwood were discouraging, due mainly to higher chemical consumption, because of liquor intake into the bark. Heat transfer into the log was hindered somewhat by the insulating properties of the bark, thereby producing a lower quality pulp. Wood presently being cooked in the 400-ton chemigroundwood plant is for the most part sap-peeled. The remainder is either drum-barked or chemically debarked.

White liquor system

Liquor preparation is accomplished by sulfiting a soda ash solution in a stainless steel absorption tower.

Soda ash is stored in slurry form and saturated solution in a tank 34 ft. high and 40 ft. in diameter. Soda ash is unloaded from railroad cars by vacuum directly into the top of the slurry tank. Constant circulation of the saturated solution from the top to the bottom of the tank through

*Abridged from a paper presented at the 1957 fall meeting of the Northeastern Division, APPMSA.



#3 MACHINE, KRAFT DIVISION, CHARLESTON, SOUTH CAROLINA. PHOTO BY J. W. MILLER

West Virginia Pulp and Paper Company

Westvaco's dramatic new extensible Kraftsman Clupak paper is produced on this modern high-speed 264″ Beloit Kraft Paper Machine. A Westvaco first, versatile Clupak paper opens new horizons to the paper industry.—"*Your partner in papermaking,*" *Beloit Iron Works, Beloit, Wisconsin.*

Table I—Comparative Physical Tests on Chemigroundwood Sapwood and Heartwood Pulp

Wood Section	Dense Hardwood Sapwood	Dense Hardwood Heartwood
Physical Strengths:		
Brightness G.E.	55.8	39.2
Ttear gms./16 sheets	23.4	10.0
Tensile kg./15 mn.	3.09	1.05
Mullen lb.	15.6	5.4
Opacity	87.6	97.2
Wet tensile GMS./15 mm.	53.0	27.0

*Tabulated results are from one test.

Table II—Cooking Cycles on Dense Hardwoods and Poplar

Dense	Poplar
1. Vacuum 1 hr.	1. Vacuum 30 min.
2. 1 hr. to top temp. 150°C	2. 1 hr. to top temp. 145°C
3. 3½ hrs. at top temp. 150°C	3. 1½ hrs. at top temp. 145°C
4. Blow back to liquor	4. Blow back of liquor
5. 1.5 lb./gal. at 4.0-1 ratio (liquor conc. and chemical ratio)	5. 1.0 lb./gal. at 4.0-1 ratio (liquor conc. and chemical ratio)

the slurry insures a uniform concentration of soda ash solution being supplied to the sulfiting system. This system was engineered by Diamond Alkali Co. One thousand tons of soda ash can be stored in this tank.

Sulfur (unloaded from cars by gravity, screw conveyors and bucket elevators) is stored in a 900-ton silo. From storage it is conveyed to a weight hopper, from which it is discharged into Hamilton melters and finally to a molten storage tank. From this molten storage tank, the sulfur is pumped by a steam turbine to a spray-gun type stationary burner. With the addition of oxygen, this sulfur is burned to produce SO_2 gas. Drawn up through the absorption tower, sulfur dioxide comees in direct contact with diluted soda ash solution of approximately 1.8 lb. per gal. concentration, which is pumped from one of the two 9000-gal. sulfiting tanks. The soda ash of one tank is sulfited to a pH of 7.0 and then buffered with soda ash to the desired cooking ratio. This buffered white liquor is then transferred to a 60,000-gal. storage tank and used, as needed, to fortify either of the two 80,000-gal. accumulators. After sulfiting one tank, automatic controls switch to the other 9000-gal. sulfiting tank.

Cooking conditions

By modifications of cooking cycles, with respect to temperature, time and liquor concentration and ratio, chemigroundwood pulp can be varied to produce soft bulky pulps, medium-strength pulps and high-strength pulps. This flexibility is very useful in controlling freeness, pulp strengths and pulp quality. Cooking cycles presently used in the 400-ton plant are less severe than those used one year ago. Present cycles on dense hardwood and poplar are given in Table II.

Present uses and advantages of chemigroundwood

Presently, approximately 25 per cent of chemigroundwood is being used in our paper machine furnishes. Trials have been made on machines with as high as 57 per cent chemigroundwood in the furnish with excellent operating results.

Advantages of utilization of hardwoods by the chemigroundwood process are many. A few of the major advantages are:

1. Conservation of dwindling softwood forests.
2. High yields and good pulp strengths.
3. No bleaching needed for newsprint grades.
4. Re-use of cooking liquor (minimizing pollution problems).
5. Low-horsepower grinding.
6. Very small percentage of rejects from screening compared to groundwood.
7. Pulp can be bleached very economically.
8. Low man-hour requirement to produce a ton of pulp compared with other processes. (This is largely due to the vertical digesters, which eliminate the loading and unloading problems. Also, the over-all plant operation is mainly controlled automatically by a centrally-located control center.)

Symposia at ACS Meeting

(Continued from Page 167)

units. Dr. T. J. Painter of McGill University (a former student of Prof. J. K. N. Jones of Queens University) spoke on the hemicelluloses of loblolly pine and in his talk included a resumé on the meaning of "true" wood cellulose. Dr. J. K. Hamilton, speaking for himself and Dr. E. V. Partlow of Rayonier Inc., presented a paper on the hemicelluloses of Western red cedar, from which he isolated a glucomannan with a glucose-to-mannose ratio of 2-to-5. The significance of these and other findings and the relationship of these polysaccharides to the hemicellulose-cellulose system in woods were discussed.

Cellulose and lignin

An important piece of work by Messrs. D. O. Meara and G. N. Richards of the British Rayon Research Association in Manchester dealt with the alkaline degradation of periodate oxycellulose. Varying degrees of oxidation were obtained, and the decomposition products were examined qualitatively and quantitatively. Glycolic, α,γ-dihydroxybutyric, formic and other volatile acids were identified and determined, and a possible mechanism of the decomposition was discussed.

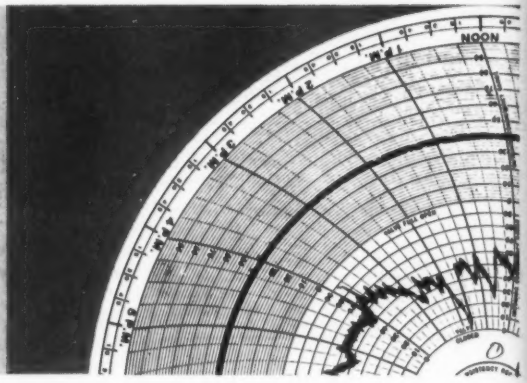
Speaking for H. Hara and for N. and I. Kimura (of Kanefaguchi Spinning Co. of Japan), Dr. K. Nakao (of Kanebo of N. Y. Inc.) spoke at some length on the chemical reactivities of rayon pulps. Dr. Kyle Ward, describing his work and that of Kei Matsusaki at the Institute of Paper Chemistry, reported on the non-glucose units in various cellulose acetates, and on the effects of mannose units on the properties of such acetates.

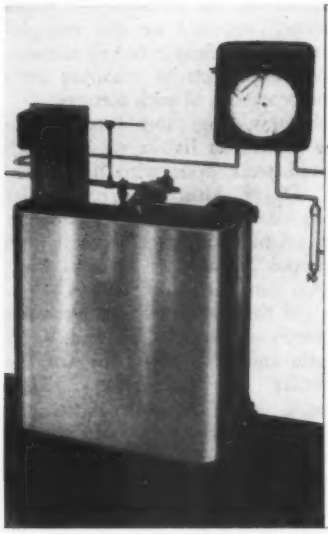
Following this came three stimulating papers on lignin, all of which involved work done with lignosulfonates. Dr. J. Moacanin (of the Jet Propulsion Laboratory at Pasadena) described his work together with that of Harold Nelson (of General Electric Co. in Richland, Wash.), E. Back (of the Swedish Forest Products Laboratory in Stockholm) and V. F. Felicetta and J. L. McCarthy (of the University of Washington). They estimated the polymolecularity of lignin sulfonates by means of diffusion measurements.

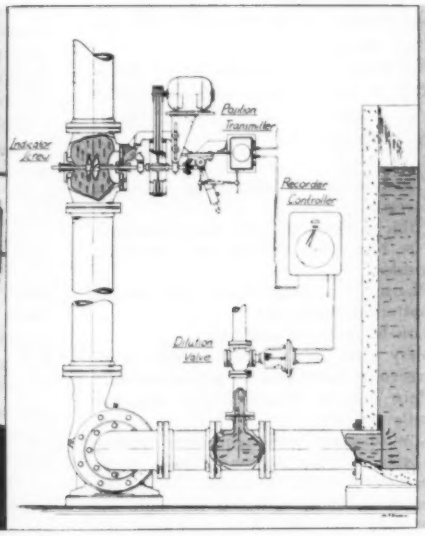
The isolation of low-molecular weight lignosulfonates from spent pulping liquors was described by Dr. Felicetta (speaking as well for Prof. McCarthy of the University of Washington and for Dr. D. Glennie of the Oregon Forest Products Laboratory at Corvallis). In this study, cation exchange resins functioned as "molecular sieves" and permitted a gross separation of polymeric substances of low-molecular weight. Finally, a dimeric phenolic material and a crystalline monomeric sulfonate were isolated. The latter was then described in some detail by Dr. Glennie, reporting his work, that of the previous speaker and of Merrill Andrus (Rohm & Haas Co., Philadelphia). Judging from its properties, and a later synthesis, the compound appears to be calcium 1-(3-methoxy-4-hydroxyphenyl)-2-propene sulfonate, which may thus be related to lignin.

3 WAYS OF LOOKING AT THE BIRD CONSISTENCY REGULATOR

CONTINUOUS 24-HOUR CHART RECORD of both incoming and outgoing consistencies proves that expensive stock is not being wasted by running overweight . . . that rejects are not being risked by running underweight.







WIDE RANGE The Bird Consistency Regulator can handle consistencies from 0.5% to as high as 8% and flow of stock from less than 50 gpm up to 5000 gpm.

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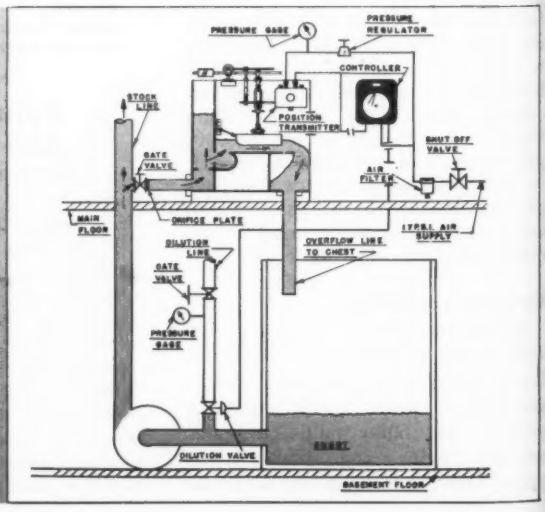

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CURRENT COMMENTS

Intensified competition and prices . . . optimism and good health

by WARREN B. BULLOCK

A flood of reports from a large number of paper companies for the March quarter shows a material falling-off as compared with the income earned in the first quarter of 1957. Whether this indicates that the prevailing unsatisfactory conditions in the paper industry will continue indefinitely remains to be seen. Production for the first quarter of this year was 7,625,633 tons, a drop of 1.7 per cent from the first quarter of 1957. Paper production was off 3.7 per cent, but paperboard was off only 0.4 per cent.

Intensified competition is reported to be having an effect on prices. One report is that some major producers of kraft wrapping paper have reduced their price to $180 per ton from the earlier $190 figure. This is explained as being due to the competition of smaller producers seeking new business by price concessions. Paper buyers question whether there will be any major upturn in buying before September, though there are definite indications that inventories have been severely depleted. As soon as the general business curve turns upward there will be a rush to restock the empty warehouses.

Pervaded with optimism

A market survey by the National Paper Trade Association indicates that sales during the first quarter of 1958 were lower than in the final quarter of 1957. Nevertheless, that association's annual meeting was pervaded with optimism based on belief in the abiding good health of the paper industry.

One market analyst says that investment confidence in paper mill securities is recovering, especially with such companies as Scott and Kimberly-Clark. His forecast is apparently confirmed by the market prices for paper mill securities in May as compared with April quotations.

Offers of special favors to United States corporations with plants in Canada in order to persuade these companies to allow partial Canadian ownership are proposed in the report of the Royal Commission on Canada's Economic Prospects. The report states that 45 per cent of Canada's pulp and paper industry is held by United States interests. Canadianization of American-owned subsidiaries in the dominion would be accomplished by "spin-off" activity whereby American-owned companies would provide for the partial ownership of their plants by Canadians. To stimulate such "spin-off" activity the Commission proposes that certain tax benefits be extended to Canadian industry with the stipulation that to enjoy these privileges foreign-controlled enterprises must be partially owned by Canadians.

The better part of wisdom

Governmental and economic reasons have accounted for the canceling or deferring of plans for additional mergers in the paper industry. St. Regis decided not to exercise its option to purchase 800,000 shares of the common stock of Growers Container of Salinas, Cal., at $2.50 per share. St. Regis, however, retains its original 32 per cent of the capital stock of the California company. Gen. Lucius D. Clay, chairman of the board of Continental Can, told the annual meeting of that company that in view of the filing of anti-trust suits by the government against Continental's mergers with Robert Gair and Hazel Atlas Glass, it was "the better part of wisdom" to hold off any more external expansion for a while. What expansion had been under consideration has not been disclosed.

Other merger proposals, however, are now under way. Subject to the approval of stockholders of Arkell & Smiths, two of that company's multiwall bag plants (at Wellsburg, W. Va., and Mobile, Ala.), will be acquired for cash by West Virginia Pulp & Paper as part of its new multiwall bag division.

Again subject to stockholder approval, Federal Paper Board will take over Federal Glass of Columbus, Ohio, giving 1.55 shares of Federal Paper Board common and ½ share of its preferred for each share of Federal Glass.

Basic terms for the merger of Eastern into Standard Packaging, subject to stockholder approval, will make Eastern a division of Standard. Each share of Eastern stock will be exchanged for 8/10 share of Standard common and one share of a new Standard cumulative preferred, convertible into one share of Standard common. Before the merger Eastern will distribute to its stockholders its holdings in Rayonier.

The industrial division of Doeskin Paper Products has been acquired by Cellu-Products of Patterson, N. C.

The future overseas?

Meanwhile, the United States paper industry is continuing its plans for expansion outside the United States. Olin Mathieson Chemical, already holding important paper producing mills, is to build a kraft pulp and paper mill in Brazil. The total investment is $4,400,000, of which Olin Mathieson will invest directly $2,200,000 with loans of $1,000,000 from Brazilian sources and $1,200,000 from International Finance Corp.

Crown Zellerbach has closed an agreement with the Newfoundland government for proposed paper and pulp operations in that province. Crown Zellerbach is allowed two years for studies of the project's feasibility, timber cruises, mill site and transportation analyses, with power and water surveys, before a precise date is set for establishing production facilities.

An unusual step has been taken by Champion Paper & Fibre in preparing for its new multimillion-dollar pulp and paper mill in Brazil. New York University has been called on to set up an educational program for the 20 Champion company technicians who will be in charge at the Brazilian mill. Under this program, these men, together with their wives and children, will be taught the language and cus-

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Current Comments . . .

toms of Brazil. The party will be in Brazil for a year to 18 months training Brazilian technicians to take over their responsibilities when the mill is in full operation.

The Federal Trade Commission has filed price-fixing charges against the Gummed Industries Association, six of its members and its managing director. It is charged that the Association set up four marketing areas to cover the United States, and that uniform prices and other conditions of sale were established for each zone.

Financial Reports

The optimism shown by the general investing public in the impending return of prosperous times was recently reflected in the stock markets and extended to paper mill securities. Of some 50 paper mill securities listed on the New York Stock Exchange, only two were priced in early May at figures lower than those at which sales were executed in early April.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	May 9, 1958	April 10, 1958
American Can	46⅞	44½
Celotex	29⅛	27⅞
Same Pref.	°19¼-19¼	17¾
Certain-Teed	9⅞	9⅛
Champion P. & F.	39	36¼
Same Pref.	°95½-102	°94-96
Chesapeake	27	26⅛
Container	20⅛	18⅞
Same Pref.	96	96
Continental Can	47⅛	47¼
Crown Zellerbach	46¼	44⅛
Same Pref.	100	°97-97½
Diamond Gardner	32½	28½
Eastern	29¾	28¾
Federal Paper Board	35	35
Same Pref.	20⅛	°20-20½
Fibre Paperboard	27¼	23¼
Same Pref.	°96-98	92
Great Northern	37⅞	39½
Hammermill	23⅛	23
International	96⅜	88½
Same Pref.	°94-94	°93½-95
Kimberly-Clark	55½	53½
MacAndrews & Forbes	26½	°26-26½
Masonite	38¾	29¼
Mead	35	33⅜
Same Pref.	95	°94½-95
Minnesota & Ontario	25⅞	24
Oxford Paper	33½	29¾
Same Pref.	°95½-97	92½
Rayonier	15¾	15⅝
Riegel	24⅜	22⅛
St. Regis	33½	30⅝
Same Pref.	°93½-95	°94-96
Scott Paper	64	62½
Same $3.40 Pref.	81½	81
Same $4 Pref.	°96½-98	98
Sealright	30½	28
Sutherland Paper	34½	33
Union Bag-Camp	34¼	31½
United B & C	25	°21¼-21⅞
United Wallpaper	7⅜	6⅜
Same Pref.	°14-15¾	°13½-15½
U.S. Gypsum	76⅛	71¾
Same Pref.	165¾	162
West Virginia P & P	35⅜	33¼
Same Pref.	101½	°93½-94

New York Stock Exchange — Bonds

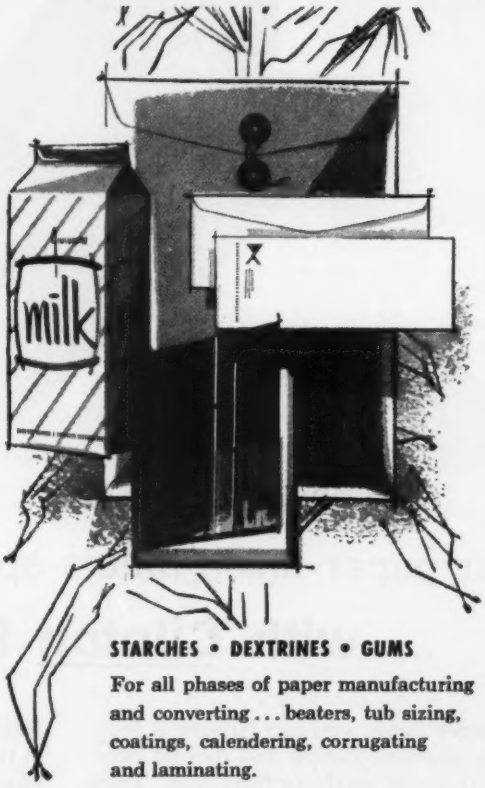
A.P.W. Prducts 5%	—	91
Champion P & F 3¾%	—	—
Champion P & F 3%	95½	95¾
Mead 3%	94½	93
Scott Paper 3%	103⅞	100¼

American Stock Exchange — Stocks

Allied Paper	8¼	9⅛
American Writing	18	18
Brown Company	11¼	10⅜
Puget Sound	15⅛	15

°Closing Bid and Asked Prices.

Look what happened to the corn we took off the cob



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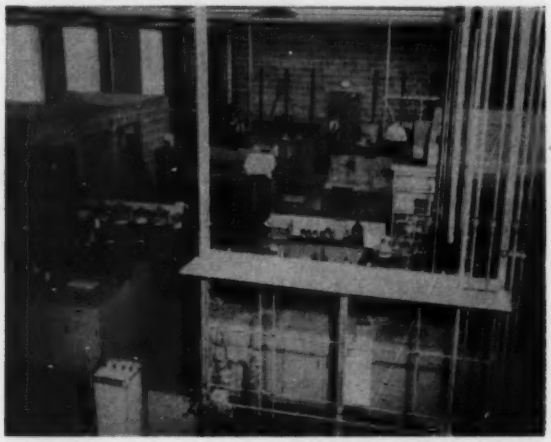
NEWS of the INDUSTRY

Battle against stream pollution takes forward step as . . .

BUILDING RECENTLY constructed on the campus of the Institute of Paper Chemistry in Appleton, Wis., especially for development work undertaken by the Sulphite Pulp Manufacturers' Research League. At the right is a section of the laboratory facilities, where studies aimed at the disposition and/or utilization of spent sulfite liquor are constantly "in work" for 23 member sulfite mills.



Sulfite Research League Moves nto New Quarters at Appleton

THE SULPHITE PULP Manufacturers' Research League has recently moved into new quarters comprising 6800 sq. ft. on the campus of the Institute of Paper Chemistry at Appleton, Wis.

Housing the League's expanded operations is the recently-constructed South Research Building erected by the Institute. The League's facilities were designed especially for the requirements of its research and development program aimed at finding new and better methods for the utilization or disposition of spent sulfite liquor.

The research laboratories, unit operation areas, library-conference room, office facilities and a special hazard-protected area for solvent extraction and high-pressure studies occupy the entire first floor of the building that was completed at a cost of $205,000. (The space is leased under a long-term arrangement with the Institute.)

The League's main pilot plants for evaporation, fermentation, trickling filter and various other operations remain on premises long occupied at the Interlake Mill of Consolidated Water Power & Paper Co. in Appleton.

Flexible Installation

The main laboratory is an open area divided into four sub-areas for research in carbohydrate, lignin, biochemical and analytical chemistry. Group leaders have individual offices.

The open design makes possible the performance of work with "less general-purpose equipment—such as balances and calculators—than was previously required when the same staff occupied individual laboratories".

Set-up frames of League design in three of the working areas provide for the flexible installation of complex equipment, all utilities being made available. The frames extend to the 16-ft. ceiling, thus allowing the use of long columns and gravity flow in chromatographic and distillation studies, etc. At one end of the main laboratory special rooms house instrumentation, constant-temperature incubation and storage areas.

One end of the building (comprising about one-third of the floor space) boasts large-scale laboratory and pilot and unit operation equipment for spray- and drum-drying, filtration, evaporation, ion exchange columns, centrifuging, distillation, fermentation and related operations commonly used for studies intermediate between laboratory and full pilot.

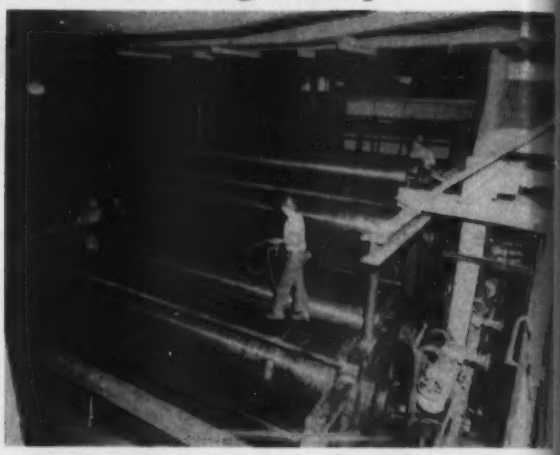
Blow-out Construction

The solvent and high-pressure hazard protection area is isolated at one corner of the building. Reinforced concrete walls provide protection on three sides, while the fourth wall is of blow-out type construction. Explosion-proof motors and equipment serve the entire area, which also has automatic fire control and an alarm system.

The League staff of 16 has as its nucleus chemists and engineers who specialize in individual fields that focus on the spent sulfite liquor problem. The League is supported by 10 member corporations that operate 23 sulfite mills from Maine to Washington.

(Turn to Page 178)

New Dryers for No. 6 at Union Bag-Camp



VARIOUS STAGES of the change-over to high-pressure dryers on No. 6 machine at Union Bag-Camp in Savannah. Actual work time comprised no more than four weeks, although the over-all project required six months.

REPLACEMENT OF DRYER rolls was a recent major project at the Savannah, Ga. mill of Union Bag-Camp Paper Corp. Over-all, the renovation extended through six months. Actual work time, however, required no more than four weeks.

When early last year the mill management decided to switch No. 6 machine to the production of heavier grades without losing speed, the wheels of change were set in motion. And a major change it was.

The existing 76-lb. steam pressure dryers had to be replaced by 150-lb. units. A dryer roll on No. 6 machine at Savannah weighed something in excess of 12 tons. Then, too, the entire piping system supplying steam to the dryers had to be "beefed up".

No. 6 is a Pusey & Jones Corp. machine boasting 83 rolls divided into four dryer sections. The job of change-over to the new P&J high-pressure rolls was tackled one section at a time.

As the work progressed, maintenance crews became more and more proficient in the task at hand.

Six days were required for completion of work on the first section—14 dryer rolls. The job on the final section—consisting of more rolls—was completed in a little more than four days. And this in spite of an added handicap—the machine was in constant operation. During the change-over of the first two sections the machine was down; during work on the last two sections the sheet was by-passed, and production continued at about a 20-per cent slower rate.

As they were removed, the old 76-lb. dryers were stored for future use. The present plans call for their installation in a new machine (No. 7).

Newsprint Earnings Down 21.7% From '56 Levels

Of 23 reporting newsprint producers, only one showed an increase in earnings during 1957. This according to the latest tabulation prepared by the Newsprint Information Committee of New York, N. Y. The average decline was 21.7 per cent, while one firm reported the maximum drop of 52.2 per cent.

The lone company reporting an increase registered a + 1.4 per cent over the previous year.

Reasons cited for the declines by the individual companies were almost identical: higher operating costs, extraordinary expenses in the start-up of new newsprint machines, production stoppages (including strikes) and the leveling-off of demand just as new facilities came into operation.

Canadian producers among the reporting firms had an additional reason—the foreign exchange premium that deprived them of an average of 4.12 per cent of their American sales dollars during the year 1956.

Climbing Costs

One annual report commented: It is highly significant that earnings declined much more than sales figures would indicate. The report added: "This can be seen more clearly in results per ton. . . . In dollars per ton—compared with 1956, our 1957 sales volume was up about 1.2 per cent, but our operating profit was down about 9 per cent, and our net profit was down nearly 13 per cent".

Climbing costs were cited as the chief factor in this pattern.

In general, the annual reports pointed up the fact that through expansion during the year the reporting firms bettered their long-term earnings potential and maintained or improved their competitive positions—although earnings were reduced as a result.

As for 1958, the following excerpt from a statement to shareholders is typical of the view in newsprint circles:

"The 1958 outlook is for lower operating ratios in terms of increased capacity, though not necessarily for any appreciably lower volume of business. . . . Most estimates to date show Canadian mills as a whole producing in 1958 at about 80 to 85 per cent of capacity."

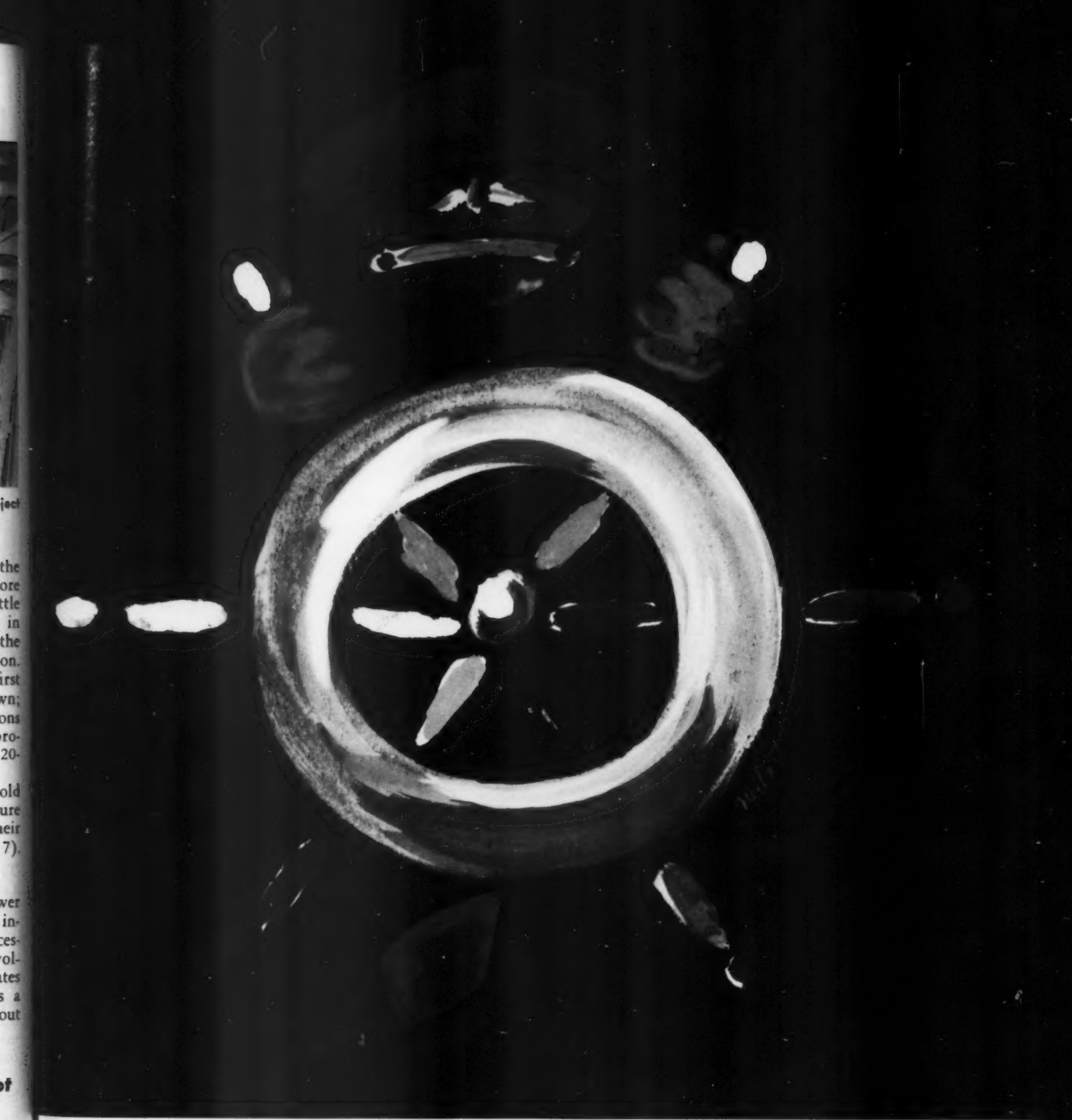
duPont Leases Riegel Pilot Plant for Paper Studies

An arrangement to lease certain pilot plant facilities of Riegel Paper Corp. has been announced by E. I. duPont de Nemours & Co.

Use of the equipment will result in expanded experimental work on the use of synthetic fibers in paper. This will permit "major scaling up of laboratory findings".

Appropriate information developed during the course of the program "will be disseminated to the paper industry to assist papermakers in taking advantage of the properties of synthetic fibers".

(Turn to Page 181)



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ADELL *Chemical Company*
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PILOT EQUIPMENT installations at Bolton's new research center. Included are laboratory-size Claflin and jordan refiners, stock screening tank, Dirtex cleaner and stock chest. The laboratory is at Lawrence, Mass.

HUMIDITY- AND AIR-controlled test room at the Pulp & Paper Research Centre where standard paper and pulp studies are conducted. Shown here is George E. Soyka, Bolton-Emerson technical director.

A CORNER of the pulp testing and wet laboratory.

COMMERCIAL PULPING and stock preparation system.

Bolton Research Keeps Pace with Paper Production at New Lab

PAPERMAKING'S BASIC PROBLEM is that of achieving the maximum yield from existing timber supplies. Toward the solution of this age-old riddle John W. Bolton & Sons Inc. has established a Pulp & Paper Research Centre in Lawrence, Mass.

Primary purpose of the center is "to conduct research and evaluation as a contribution to improved methods in fiber treatment and stock preparation systems". It is but one facet of the constant effort on the part of the many firms supplying the pulp and paper industry to keep pace with the ever-increasing production of pulp, paper and paperboard.

The broad primary purpose also includes such activities as machine design and testing, the formulation and testing of various production systems —as well as methods of formulating and applying controls and instrumentation.

The Pulp & Paper Research Centre contains both a physical and analytical laboratory equipped with modern testing equipment and able to maintain both the standards of Tappi and those of individual customers.

Needed: easy understanding

"Papermaking was formerly regarded as an art", according to George E. Soyka, "with secrets closely held by practitioners. Nowadays, we in the industry regard it as a science and attempt to express our findings in terms and numbers that can be easily understood and communicated."

Soyka, who is Bolton's technical director, elaborated on the need for achieving the maximum yield from existing timber supplies: "From this (problem) stem other problems having to do with defibering or pulp treatment—how to process pulp to produce paper and board of better quality faster and more economically, how to utilize short-fibered hardwoods and vegetable fibers such as bagasse or cotton. . . . And from these problems come still others. For example, development of the actual machinery that will make laboratory solutions feasible for production".

Soyka pointed out that the research center is equipped for both basic research and to duplicate on laboratory, pilot plant and commercial scale the actual specifics on the problem presented.

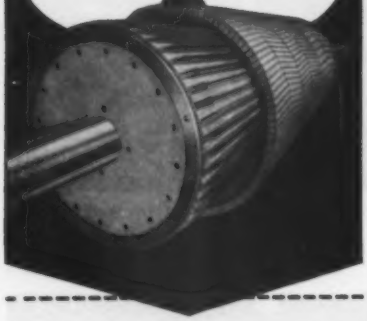
The pilot plant of the research center performs small-scale production runs—its equipment is similar to production machinery in everything but size. While the larger pilot unit can perform commercial production runs. Its equipment is of the size range used in actual paper mills.

Principal speaker at the laboratory dedication ceremonies was A. E. Harold Fair, president of Brown Co., who discussed the purpose of research.

(Turn to Page 182)

IDEAL COMBINATION FOR ANY

Conical Refiner



Jones Adapta-Plug

The completely bandless plug for *all* Jordans, the Jones Adapta-Plug is also the strongest, most adaptable, most economical plug ever made.

This revolutionary advance, exclusive with Jones, not only holds bars more securely, reduces slot wear and corrosion, but also cuts hours from the job of stripping and filling.

Before you replace another Jordan plug — ask your Jones representative about Adapta-Plug — or write us direct.

Jones FULBAR SHELL FILLINGS

Fulbar Shell Fillings eliminate keys and wedges. One piece construction fits shell body of any Jordan, simplifies handling, cuts installation time. And the patented No-wave pattern — also exclusive with Jones — has no sharp bar-ends to form strings or lumps.

For improved quality, more economical, trouble-free operation — make your next Jordan filling a FULBAR.

Rigid, one-piece FULBAR easily accommodates to inequalities in shell body of old, worn Jordans — is simpler to install, easier to grind in.

E. D. JONES & SONS COMPANY
Pittsfield, Mass.
In Canada: The Alexander Fleck, Ltd., Ottawa
BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

Pulp & Paper Section Adopts "Safest Industry" Symbol

The Pulp & Paper Section of the National Safety Council has adopted an official symbol.

Calling for "Quality Production with Safety", the target design will be a rallying point for the industry in achieving an ever-improving safety record.

The insignia was adopted by the Section during the National Safety Congress at Chicago in October. The award for its design was made to Joe Greenberg of the Gaylord Container Div. of Crown Zellerbach Corp. in Bogalusa, La. It was his conception of the symbol that was awarded the prize in a competition sponsored by the Pulp & Paper Section.

The idea of a symbol for the section was conceived originally by Fred O. Soughton, past general chairman. And it was the result of his work that the design competition was organized and carried through.

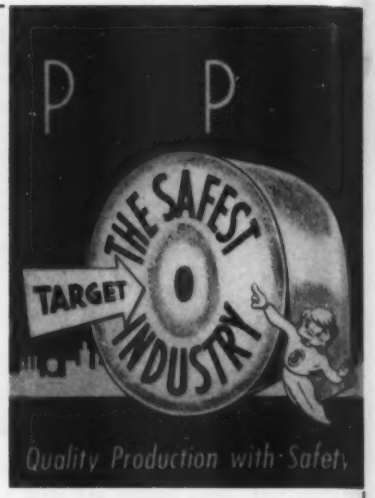
In introducing the target design recently, Earl F. Ripstra declared, "The pulp and paper industry is not doing as well as it can to prevent occupational injuries to its own people".

Ripstra, who is general chairman of the Pulp & Paper Section, continued: "Our industry has made some whopping gains in preventing accidents—an 84-per cent reduction in frequency rate and a 68-per cent reduction in severity rate since 1920. The industry is to be congratulated for this accomplishment, but . . .

"We still have too many occupational injuries. Last year participants in the NSC Pulp & Paper Section Safety Contest reported 5441 disabling injuries. The frequency rate for the industry—exclusive of pulpwood logging—was 7.08 . . . We can do better than that . . .

"There is a lot of merit (and magic) in setting sights on a target and really believing that it can be achieved. But, faith without some healthy effort is of little use. Tie the industry's target in with your safety activities . . . .

"It's time to make widespread use of our target campaign—5441 injuries is 5441 too many. It's going to take some time, a lot of effort and ingenuity and some cold cash to do the job. We should all make it our business to see to it that the pulp and paper industry becomes 'the safest industry' in business."



Recent Expansions in the Industry

Nekoosa-Edwards Paper Co. is constructing additions at Nekoosa, Wis., to house expanded finishing, shipping and warehouse facilities. The general contract for the project has been awarded to Paul A. Laurence Co. of Minneapolis.

Container Corp. of America's new folding carton plant at Solon, Ohio, was scheduled to be in full production by early June. (Solon is about 16 miles southeast of Cleveland.) The $1,300,000 operation replaces the Cleveland facility, which now produces only corrugated shipping containers. Paperboard for Solon is to be supplied by company mills at Wabash, Ind., Chicago and Philadelphia, with foodboard to be shipped to the Ohio plant from Container Corp.'s new $30,000,000 solid bleached kraft mill at Brewton, Ala. Installed at Solon is a complete line of multicolor letterpress equipment, cutting and creasing presses and gluing units. Contemplated for installation at a later date is a vacuum disposal system.

Crown Zellerbach Corp. reported in May that an agreement with the Newfoundland provincial goverment was expected soon that would make possible the construction of large pulp and paper mills in the area. According to CZ spokesmen, the San Francisco firm hoped to make a thorough study of the project by early summer.

Sealright-Oswego Falls Corp. with headquarters at Fulton, N.Y., will expand its Kansas City, Kans. plant with a unit for warehousing

and manufacturing. According to the manufacturer of paper containers and milk bottle closures, the project will cost about $500,000.

Standard Packaging Corp.
has entered into an agreement to acquire the assets of Johnston Foil Mfg. Co. of St. Louis. The Missouri firm is one of the country's oldest manufacturers in the rolling of aluminum and lead foil. Standard Packaging is exchanging 225,385 shares of its common for the Johnston assets, and the latter firm will be operated as a Standard Packaging division.

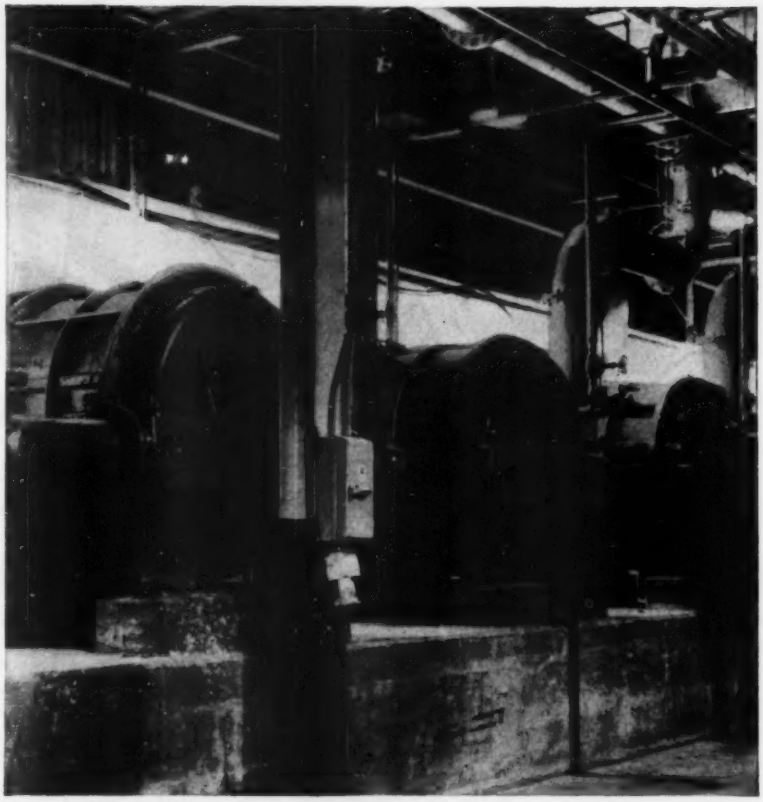
Charmin Paper Products Co.,
a subsidiary of Proctor & Gamble Co., has reported the May 5 start-up of its Cheboygan, Mich. plant. The plant—purchased by the Green Bay, Wis. firm in 1956 and inoperative since 1953—will be expanded as follows: a groundwood mill to be in operation by August; a second paper machine (production scheduled for the spring or early summer of 1959), and a bleach plant to follow the second paper machine.

Continental Can Co.
has awarded a contract for the construction of a corrugated box plant in Tyler, Texas, and operation is scheduled for July 31. Corrugated sheets will be supplied to the 45,000-sq. ft. facility by Continental Can's Jackson, Miss. plant. The Tyler operation has been planned with future expansion in mind, and a corrugator is to be added at a later date.

Milprint Inc.
will expand its research and product development department through the establishment of a research division and a product development division. The former will expand the company's activities in basic packaging studies, while the latter will add personnel and facilities for exploration into new product possibilities.

Olin Mathieson Chemical Corp.
will construct a corrugated shipping container plant at Joliet, Ill., as part

What, actually, do Vacuum Pumps on paper machines handle?



Paper mill engineers know that it is actually a mixture of air and water vapor, but the custom of rating vacuum pumps in terms of air capacity alone causes this important fact to be frequently overlooked.

The presence of this water vapor causes a considerable reduction of the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump the bulk of this water vapor is effectively condensed, due to the Nash operating principle. The air handling capacity of the Nash is therefore not reduced.

That is one of the reasons why Nash Vacuum Pumps are standard in over a thousand leading Paper Mills.

NASH ENGINEERING COMPANY
443 WILSON ROAD, SO. NORWALK, CONN.

introducing

the one and only - - -

Mr. p. g.

The little fellow with the versatile personality.

HYDROXY ETHYL ETHER STARCH*, he can do more things for paper manufacturers and converters than the past masters — and better! You'll be seeing plenty of Mr. P. G. from now on, displaying the talents he can do best for you. He's a real performer — with talent up to his monocle! Remember to watch for Mr. P. G. in the coming months.

*(U.S. Patent Nos. 2,516,632; 2,516,633; 2,516,634)

PENICK & FORD, LTD.

INCORPORATED

750 THIRD AVENUE, NEW YORK 17, N. Y.; 1531 MARIETTA BLVD., ATLANTA, GA.; CEDAR RAPIDS, IOWA; 18 CALIFORNIA ST., SAN FRANCISCO 11, CALIF.

NEW 47" CHIPPER
for Slabs or Round Wood

Chipper with top of blowing hood removed, showing chip slots and blowing vanes.

Ideally suited to the production of good quality chips from sawmill slabs and other waste woods, the new Carthage 47" Chipper is of rugged, fundamentally sound design and provides low first cost as well as low maintenance cost.

Designed to take slabs up to 16" wide and pulpwood up to 7" diameter, the chipper will quickly pay for itself in the utilization of waste wood. The chips are uniform in size, with minimum sawdust. Chips can be discharged by blowing to either right or left, or they may be discharged underneath as required. Power requirements are unusually low.

Write for Bulletin 47

CARTHAGE MACHINE COMPANY CARTHAGE, NEW YORK

Manufacturers of Log Barkers, Log Splitters, Log Chippers, Slab Barkers, Slab Chippers, Chip Screens

WADLEY, GA., Fulghum Industries, Ph. 168
WAYNESBORO, PA., Frick Company, Ph. 1245
WILMINGTON, N. C., Hyman Supply Co., Ph. 5293
PORTLAND, ORE., Ray Smythe Co., Ph. CApitol 3-2238
TORONTO, ONT., A. M. Kerr Equip. Co., Ph. PLymouth 5-1134

ATLANTA, GA.
Ed Crowley
Ph. POplar 6-3209

BIRMINGHAM 1, ALA.
M. A. Bell
Box 490
Ph. LYric 2-1042

MONTREAL, QUE.
R. K. Strapp
1645 Blvd. Ed. Laurin
Ph. Riverside 7-5103

News of the Industry . . .

of a "program to place container plants within major marketing areas . . .". Joliet capacity will be a monthly 30,000,000 sq, ft. of corrugated board in a 155,000-sq. ft. structure. Equipment will include an 85-in. Langston corrugator with three flutes and three printer slotters.

Irving Pulp & Paper Ltd. will construct a paper mill at a cost of between $5,000,000 and $7,000,000 at Lancaster, N.B.—"if an agreement is reached with the city". The plant is to be separate from the Irving sulfate mill and the kraft mill now under construction. It will have one paper machine and a daily production capacity of 50 tons, with provision for the possible future installation of a second unit.

Alberta West Forest Products Corp. has completed engineering plans for the construction of a $25,000,000 pulp and paper mill near Edmonton, Alta. Initial operation is expected in 1961. The chief product will be a "top-quality newsprint". The operating level is to be about 300 daily tons, but plans are "for considerably higher tonnage at a later date". The project calls for a chemical groundwood pulp mill and full utilization of the firm's forest products. The forest management license held by Alberta West covers a limit of 5000 sq. mi.

World's Largest Machine in Operation at Alabama Mill of Coosa River

The start-up of a giant newsprint machine has culminated a two-year $35,000,000 expansion project at Coosa River Newsprint Co. in Coosa Pines, Ala. The unit, said to be the world's largest, adds an annual 140,000 tons to the plant's capacity.

The Beloit Iron Works machine —the third to be installed at the plant—is 343 in. in width. Its break-in runs reached speeds of 2500 fpm, and at such speeds production amounts to more than 400 tons per day. (The plant's other two units are 226 in. wide and have a total daily production of 450 tons.)

A. C. Wakeman, president of Coosa River, reported that the new machine was built "to assure the 128 publishers who are stockholders in the company an adequate supply of newsprint, for which they have contracted".

(The Coosa River mills are managed by Kimberly-Clark Corp.)

$1,500,000 Addition at Blandin Paper Mill

Construction of a $1,500,000 addition at the Grand Rapids, Minn. mill of Blandin Paper Co. was to be undertaken in May. Completion is expected early next year.

The structure—an addition to the front of the mill proper—will house a Rice Barton Corp. coater. The unit will be of the trailing blade type originally pioneered by Blandin Paper. The sectional electric drive is to be furnished by General Electric Co.

The new coater will handle all the production from No. 3 machine and will eventually produce a daily 120 tons of two-sided coated paper.

Allied News Notes . . .

Allied Chemical Corp. is the recently adopted name of Allied Chemical & Dye Corp. The change

News of the Industry . . .

was made to "more accurately describe the breadth of the company's activities".

Chicago Bridge & Iron Co. has announced the purchase of Conkey equipment, patents, applications, drawings, patterns and records from Henry Hunter and George Dickey of New York, N. Y. Evaporator, crystallizer and filter equipment previously sold by the CB&I Conkey Div.—now integrated with CB&I operations—are designated as Chicago Bridge & Iron evaporators, crystallizers and filters.

Black-Clawson Co. has added new high-speed drying equipment at the coating laboratory of the Dilts Div. in Fulton, N. Y. By use of the new dryer, the many coating methods for which B-C builds the equipment can be demonstrated at commercial speeds on webs of up to 18 in.

Appleton Machine Co. has acquired Doven Machine & Engineering Inc. of Chicago, a long-time builder of specialty slitting and rewinding equipment for the paper industry. The plant is to be moved to Appleton, Wis., and operated as the Doven Div.

"From ingot to fourdrinier wire"

QUALITY-CONTROL THROUGH THE LABORATORY

Shown here is a small section of our laboratory, which is housed in its own building and is completely equipped with the most modern instruments.

Its staff is dedicated to a two-fold purpose:

1. *Quality control during every phase of fourdrinier wire manufacture.*
2. *Constant study, research and evaluation for future progress.*

From the raw metals to your finished fourdrinier wires, we are proud to say they are *truly ours*—scientifically controlled from the ingot to the finished product.

EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

Sandy Hill Iron & Brass: 100 Years of Progress

Sandy Hill Iron & Brass Works is embarking on its second century. The Hudson Falls, N. Y. firm—a major supplier to the pulp and paper industry—paused recently to commemorate the milestone.

Sandy Hill had its early beginnings in 1858 with the establishment of Baker's Falls Iron & Machine Works for the production of turbine water wheels. Paper mills in the area gave impetus to the great change in Sandy Hill's industrial life: mill repair and replacement work led to the development of special mill machinery and inevitably to the design and construction of complete paper machines.

One of the early prime movers in the fortunes of the company was Francis M. Van Wormer, whose influence was keenly felt in the water wheels-to-paper machines period.

And on through the company's history the men at the helm have helped mold the Sandy Hill that today is a leader in the industry—from Van Wormer to the current president, J. Walter Juckett, who last year succeeded his father, the late Frank A. Juckett, as head of the firm. Men like Richard C. Teft Sr. (president from 1907 to 1919) and A. J. Kennedy (1919 to 1935)—these are the men who made the first 100 years possible.

Coming Events

Tappi

July 7-18—Seventh Statistics Course, Laval University, Quebec, P. Q.

July 28-August 1—13th Engineering Conference, Multnomah Hotel, Portland, Ore.

September 10-12—Third Mechanical Pulping Conference, Chateau Frontenac Hotel, Quebec, P. Q.

September 15-17—Fundamental Research Conference, Queen Elizabeth Hotel, Montreal

Superintendents Association

September 4-6—New York-Canadian Division, Lake Placid Club, Essex County, N. Y.

September 12-13—Northwestern Division, Conway Hotel, Appleton, Wis.

September 18-20—Northeastern Division, Poland Spring House, Poland Spring, Maine

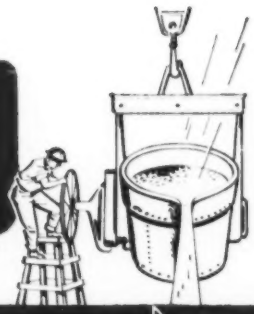
Other meetings

June 22-July 11—Western Michigan University, "Principles and Practice of Coated Paper Manufacture" (three-week summer class), Paper Industry Laboratories, Kalamazoo

June 22-27—Forest Products Research Society, (12th annual meeting), Madison, Wis.

Hold Your Fire...
WEYERHAEUSER

UNITED® PAPER MILL ROLLS



NOW...

UNITED CAN FURNISH

- THE *LONGEST* ROLLS

AND

- THE *HEAVIEST* ROLLS

REQUIRED BY THE PAPER INDUSTRY

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON • WILMINGTON

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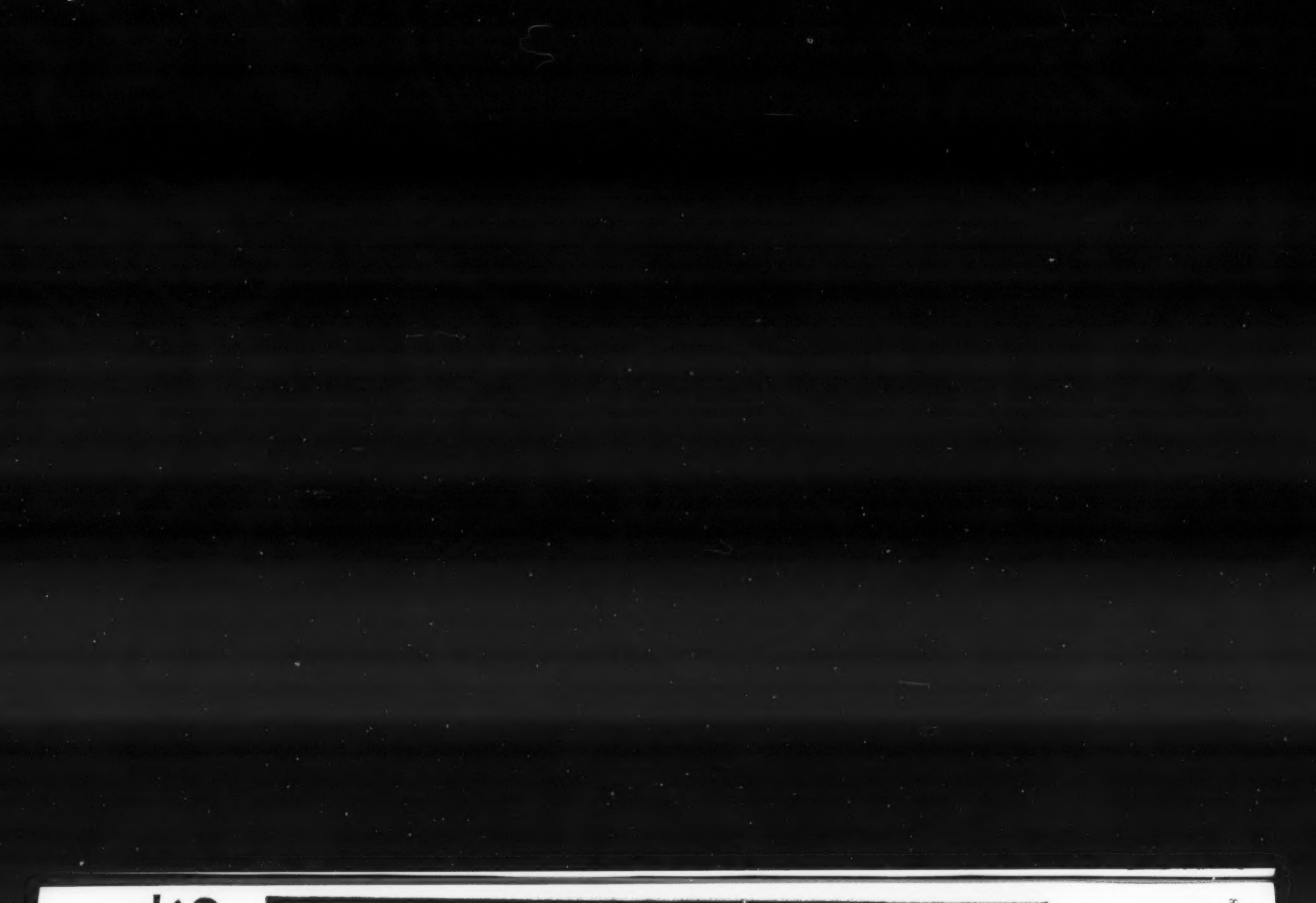
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.



NAMES in the NEWS

Woodlands Veteran Retires at West Virginia

William D. Comings, who pioneered West Virginia Pulp & Paper Co.'s acquisition and development of southern pine forests, has retired after 36 years of service. He was manager of the firm's Woodlands Department.

A graduate forester, Comings joined West Virginia Pulp & Paper in South Carolina. One of his assignments was the purchase of extensive southern forest tracts, after which he organized the properties in preparation for the intensive management program now in effect.

Comings became assistant manager of woodlands in 1931 and was advanced to manager in 1939.

Collinge Gets Hinton Post

Harry K. Collinge, since 1952 a private consultant to the paper and pulp industry, has been appointed resident manager of the bleached sulfate pulp mill of North Western Pulp & Power Ltd. at Hinton, Alta. (St. Regis Paper Co. owns a one-half interest in the mill, manages its operation and sells the output. The remaining interest is controlled by North Canadian Oils Ltd.)

From 1932 to 1952 Collinge served with Howard Smith Paper Mills Ltd. and was general manager of Canada Paper Co. at the time he left to enter private practice.

In his new post Collinge succeeds A. Thomas Easley, who has resigned.

H. K. Collinge

Harley Nelson

Maremont Becomes President of Allied Paper Corp.

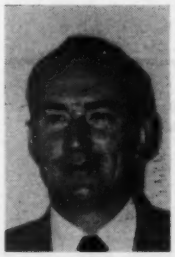
Arnold H. Maremont, recently re-elected chairman of the board, has been named president of Allied Paper Corp. He fills the vacancy created when Charles F. Chaplin resigned and was elected a vice president.

In another Allied Paper appointment, Michael D. Maremont was named administrative assistant to the executive vice president. He will continue his function as head of sales administration.

And Harley Nelson was recently promoted to the post of technical director for the Kalamazoo Div. His former position as manufacturing manager has been eliminated.

It was also announced that Walter Vastrick, formerly director of quality control, has been promoted to the position of assistant technical director, and that the position of technical control superintendent will now be filled by Clayton Russell.

In still another Allied change, W. A. Kirkpatrick left the company as of April 30. He was vice president for research and development and was a veteran of more than 20 years with the firm. Prior to Kirkpatrick's association with Allied and its predecessor firm (Allied Paper Mills), he was associated with S. D. Warren Co. of Cumberland Mills, Maine.



A. L. Wiley

Raymond Hall

Riegel Appoints Four at New Carolina Paper Mill

Riegel Paper Corp. has announced the appointment of A. L. Wiley as assistant to the manager of paper production at the Carolina mill now under construction at Acme, N.C.

Wiley was formerly assistant to the manager of pulp production and has served as technical director and assistant production manager. He joined Riegel in 1951, prior to which he was with Champion Paper & Fibre Co.

Raymond Hall, formerly assistant technical director for Allied Paper Corp., has joined the Carolina Div. as coating supervisor.

Two assistant paper mill superintendents have also been named at the division: E. A. Henry, former assistant pulp mill superintendent, and Henry Brodnax, previously paper mill superintendent for Potlatch Forests.

In another Riegel appointment, L. H. Bidwell Jr. becomes assistant to the Upper Mills Manager in the New Jersey Div. He was formerly superintendent of the Hughesville, N.J. mill. Succeeding him at Hughesville is D. H. Newcomb, who has been serving as acting superintendent.

Rayonier Changes

Rayonier Inc. has reported the following changes and promotions in its southeastern operations:

George E. Scofield, a 21-year veteran with the firm and most recently resident manager at the Fernandina Div. in Fernandina Beach, Fla., has been named resident manager at Jesup, Ga.

Succeeding Scofield at Fernandina Beach is Blanton W. Haskell, formerly chief engineer for the Southeast Central Engineering Div.

Charles E. Hill has joined the staff of West Virginia Pulp & Paper Co.'s research organization in Covington, Va. In his first assignment he is on loan for an extended period to the Fine Papers Div. at Luke, Md., where he is in charge of special design projects. Hill was formerly chief engineer for Patton Mfg. Co. and at one time was associated with Pusey & Jones Co.

C. E. Hill

F. B. Wardwell

Frederick B. Wardwell, formerly superintendent of Brown Co.'s Riverside paper mill, has been made operating superintendent of the Towel Department at the Cascade mill. In another change at the Berlin, N.H. firm, **Conrad T. Waldie Jr.** has been named chief technical

service engineer in the newly formed Staff Technical Service Group. For the past four years he has been in charge of towel production.

Carl A. Olsson, general woodlands manager, has been promoted to the post of vice president and general woodlands manager for Chesapeake Corp. of Virginia.

Theodore W. Dunn has been named chairman of the board of Dunn Paper Co. of Port Huron, Mich. He is being succeeded as president by **George C. Dunn,** formerly executive vice president. The senior Dunn continues as treasurer, a post he has held since 1948.

Raymond C. Comins has retired as president of Sanitary Paper Mills Inc. of East Hartford, Conn. He becomes vice chairman of the board of directors. Succeeding him is **A. Marshall Lawton,** formerly president of Torrington (Conn.) Water Co. Comins has been associated with Sanitary Paper Mills since 1931 and has served as president since 1943.

John A. Aull Jr. has retired as senior vice president and treasurer of Sorg Paper Co. Aull, who has held the positions since 1956 and who has been with the firm since 1938, continues as a member of the board of directors.

Ramon R. McNeil has been appointed research chemist for Minnesota & Ontario Paper Co. at its International Falls, Minn. laboratory. He was formerly with Munising Paper Co. and was at one time associated with Wood Conversion Co.

Allied Personalities . . .

Alex W. Spears Jr. of Mobile, Ala., has been named sales and service representative for Mount Hope Machinery Co. in Alabama, western Tennessee, Louisiana, Mississippi, Arkansas, Texas and Oklahoma. He is a graduate engineer and a veteran in the field of industrial control instrumentation.

James A. Foxgrover of Kalamazoo, general sales manager of Hercules Powder Co.'s Paper Makers Chemical Department, retired on June 1 after 39 years of service with the firm.

Dean A. Miller, manager of Chicago Bridge & Iron Co.'s sales office in Birmingham, Ala., retired May 1 after 39 years' service with the company. He began his career at the CB&I main office in Chicago in 1919, being transferred to Birmingham in 1933.

James O. Starkweather has joined the Industrial Engineering Department of Ebasco Services Inc. as a paper mill engineer. A graduate mechanical engineer, he has been associated with paper manufacturers since 1948 (Hollingsworth & Whitney Co. and Great Northern Paper Co.).

Bird Machine Co. has elected **Calvin A. King** first vice president and **Henry H. Shepherd** vice president in charge of sales. King, with the firm 12 years, was formerly assistant to the president; while Shepherd, a 20-year veteran, was general sales manager.

Thomas R. Tucker Jr., formerly of Chicago Bridge & Iron Co.'s Birmingham, Ala. Erection District, has been transferred to the Atlanta sales office. He joined the CB&I staff in 1953.

Huyck Felt Co. of Rensselaer, N.Y., has announced the promotion of **Warren C. Naugler** to felt sales engineer for southern New England. He was formerly field service engineer and was at one time with Eastern Corp.

Lawrence J. Horan, since 1956 district supervisor of New York sales, has been named Southeastern Div. manager for National Starch Products Inc. He will headquarter in Atlanta.

Dr. Veeriah Kota, formerly a member of the laboratory staff at Air Force Cambridge Research Center, has been appointed director of research for H. Waterbury & Sons Co. Dr. Kota is a native of India and is a specialist in photochemistry.

Wayne Back, a 20-year veteran with the firm, has been made service manager for Manchester Machine Co. of Middletown, Ohio. He is to be in charge of sales and service for all roll grinding and general repair work on paper mill machinery.

Herbert G. Vore, with the firm since 1954 as a development engineer, has been named technical director for Improved Machinery Inc.

Greater Production of Higher Quality Pulp

• in Less Time

• at Lower Cost

This is the end result of the various processes and equipment which we have installed in pulp mills throughout North America. Send us details of your requirements.

Chemipulp Process Inc.
Woolworth Bldg. Watertown, N.Y.

Associated with
Chemipulp Process Ltd., 253 Ontario St., Kingston, Ontario

West Coast
A. H. Lundberg, Inc.
P.O. Box 202
Mercer Island, Wash.

Lundberg-Ahlen Equipment Ltd.
146 E. Broadway, Vancouver

Necrology . . .

Logan R. Herbert

Logan R. Herbert, 62, died April 30 in Dayton, Ohio. He was vice president and treasurer of Midwest-Fulton Machine Co. until its acquisition by J. O. Ross Engineering Corp. several years ago.

For many years prominent in the paper industry, Herbert joined the staff of Jeffrey Mfg. Co. shortly after World War I. In 1926 he was one of the co-founders of Midwest Machine Co. This firm later merged with Fulton Engineering Co. of Middletown, Ohio, to become Midwest-Fulton Machine—a leading supplier of dryer drainage systems for the paper industry.

His two sons—John W. of Dayton and George S. of Yellow Springs—are also active in the paper industry.

Calvin H. Nealley

Calvin H. Nealley, chairman of the board of directors of Eastwood-Nealley Corp., died in April in Denville, N. J. At the time of his death he was 88 years of age and had been an officer of the firm more than 50 years.

A graduate of the University of Maine, Nealley joined the staff of Otis Falls Pulp Co. of Portland in 1897 following a short tenure on the faculty of the U. of M. graduate business school. On the formation of International Paper Co. in 1898 he was made I. P. Co.'s assistant manager of purchasing.

In 1908 Nealley became treasurer of the Eastwood organization, and in 1921 on the death of John H. Eastwood he became president. He was named chairman of the board in 1952—the post he held at the time of his death.

Charles A. Cass

Charles A. Cass, former member of the board of directors and secretary of West Virginia Pulp & Paper Co. until his retirement in 1947, died in April at his New York, N.Y. home.

A graduate of Princeton, Cass had served the company 45 years, having joined the staff in 1902 as a salesman. He became assistant secretary in 1908 and secretary in 1909, a post he held until his 1947 retirement. He was elected to the board of directors in 1927.

The Cass family had been associated with West Virginia Pulp & Paper many years. Cass followed in the footsteps of his father, Joseph K. Cass, who was one of the owners of Morrison, Bare & Cass Paper Co. at Tyrone, Pa., until its purchase by West Virginia in 1891. The elder Cass served as a West Virginia director and vice president from 1899 to 1905 and as chairman of the board from 1909 until his death in 1938.

Arthur C. Hastings

Arthur C. Hastings, 97, retired president of American Writing Paper Corp. and a former president of the American Paper & Pulp Association, died early in May at Hyannis, Mass.

Hastings served as president of American Writing Paper from 1915 until 1919. He was founder and first president of Cliff Paper Co. of Niagara Falls, N. Y. In addition to his business duties, Hastings served two terms as mayor of Niagara Falls and one term as treasurer of Niagara County.

Julius T. Jaeger

Julius T. Jaeger, 84, an authority on papermaking and prominent consulting engineer to pulp and paper manufacturers, died in May at his Hamilton, Ont. home.

A native of Germany, Jaeger had lived in Hamilton 35 years. He retired from active interest in the industry in 1948.

Jaeger had served as engineer for the building of mills at Fort Frances, Ont., and at International Falls, Minn. He had also been associated in a consulting capacity with Hudson River Paper Co., Abitibi Power & Paper Co. Ltd. and Ontario Paper Co.

Osborn H. Cilley, vice president and a director of Raybestos-Manhattan Inc., died April 15 at a Lancaster, Pa. hospital. He was 75.

Winthrop P. Stevens, 60, manager of industrial relations for Huyck Felt Co. of Rensselaer, N. Y., died in April. He joined the firm 38 years ago following graduation from Yale University. Stevens was a past chairman of the annual Human Relations in Industry Conference at Silver Bay, N. Y.

Walter S. Reed, vice president, director and general sales manager for Dexter Co., a division of Miehle-Goss-Dexter Inc., died in May

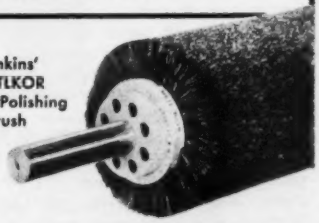
(Continued on Page 210)

PRIVATE EYES

Jenkins' METLKOR brushes, teamed with Viking's Void Detector, check every inch of paper as it is made, find holes, measure them, count them, record them, pinpoint their positions and signal the operator, all automatically. The Jenkins' feeler brush, a critical part of the system, sends a low voltage pulse to the Viking Indicator Unit whenever a hole appears.

John Glump, Vice-President of Viking Instruments, Inc., of East Haddam, Conn., says: "Jenkins' brushes do a superb job for us. They are an improvement on 13 counts:

1. Improve accuracy of flaw detection.
2. Have no abrasive effect on product.
3. Eliminate lint problem.
4. Outlast previous brushes 3 to 1.
5. Made exactly to size, no cutting or alterations necessary.
6. Simplified mounting.
7. Improved construction.
8. Superior bristles.
9. Refillable when bristle is worn.
10. More economical.
11. Free engineering service.
12. Speedy solution to problem.
13. Quick delivery."



Jenkins' METLKOR Paper Polishing Brush

Jenkins' also makes the following brushes for the paper industry:

Conveyor Cleaning • Blanket Washer • Fourdrinier Wire Cleaning • Polishing • Coating • Dusting • Dampening • Spray • Sieve • Static Elimination • Flocking • Felt Cleaning • Feed or Carrier • Paint Brushes • Floor Sweeps

Specify Jenkins' METLKOR the original . . . the best *Metal Core* brush

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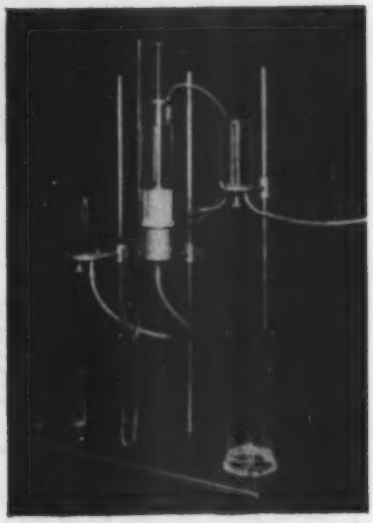
FOREIGN ABSTRACTS



Specific external surface of fines in groundwood

Mechanical pulp may contain two very different types of fine particles. These have been differentiated in the German literature by the terms, "Schleimstoff I" and "Mehlstoff II". I has the property of swelling and serving as an adhesive which causes an increase in the strength properties of the pulp sheet. II is very finely-powdered wood meal which actually lowers sheet strength.

In the present paper the authors, after reviewing the literature, have made orienting experiments to determine the specific surfaces of I and of II. They used essentially the Robertson-Mason apparatus and technique, which the Canadians had applied in the measurement of the specific external surface of fibers [cf. *Pulp & Paper Mag. Canada* 48, 103 (1947)]. Slight modifications were made in adapting this to measurements of specific surfaces of I and II obtained from groundwood. The somewhat simplified equipment is shown in the figure. The specific surface of I was so much greater than that of II that the method proved serviceable and accurate enough to differentiate between pulps that contained large amounts of I and those that were high in II.

However more exhaustive studies are required to determine whether a reliable method (based on this technique) can show the percentage of I and/or II in a sample of groundwood.

Twenty-four references, four tables, two figures and three graphs. Walter Brecht and Daniel Schanz *Wochbl. Papierfabrik* 85, No. 23. 891-898 (1957), (in German).

Distribution of components in the cell walls of wood

The present work makes it possible to use the interference microscope in the development of a new cytochemical technique for the chemical analysis of different parts of the woody plant cell. Thus an analysis can be made without any chemical pretreatment of the fiber, which thus remains unchanged.

The principle of the interference microscope (Dyson's design) is described briefly, and the theoretical and experimental background for determining lignin and the total carbohydrates in different parts of the cell wall are given.

New preliminary data are also given for cross sections of spruce wood showing the chemical composition of the compound middle lamella and the secondary wall. These show marked variations in the percentage of the carbohydrates and the lignin. In the middle lamella, the lignin ranged from 53 to 82 per cent. In the secondary layer the lignin varied from 8 to 19 per cent.

Six figures, one table and 15 references are given. Paul W. Lange and Amund Kjaer. *Norsk Skogind.* 11, 425-32 (1957). (Original in Swedish with brief English summary).

Effects of microorganisms on groundwood

Studies were made on the effects of preservative treatment and storage of several months on the quality of mechanical pulp.

Strength and freeness were little affected by storage but treated pulp retained its strength longer than did the untreated groundwood. Use of infected pulp in mill practice is discussed. An important problem affecting its use is that of specks caused by lack of disintegration of pulp infected by red rot. Screens may also become plugged and there may be more frequent breaks both at the wet and the dry ends of the machine.

The disintegration problem was studied. Wetting agents proved ineffective but certain alkaline additives showed promise.

B. H. Browning. *Brit. Paper & Board Makers Assoc. Proc. Tech. Sect.* 38, No. 2, 255-264; discussion 265-272 (1957), through *B. I. P. Paper Chem.* 28, 497 (1957).

Starch, titanium dioxide and dyes in papermaking

The following subjects are treated: the advantages of starch as a wet-end additive and the optimum temperature and viscosity of the starch solution; the applications of starch esters and ethers, and of starch complexed with formaldehyde or dimethylol urea; uses of titanium oxide as a loading material in achieving high brightness and opacity; the retention of titanium oxide and its recovery; the effects of alum, carboxymethyl cellulose wheat starch and urea (or) melamine-formaldehyde resins on titanium oxide retention; methods used in dyeing pulp and paper by impregnation and by surface treatment; the types of dyes used in coloring paper.

The effects of pH and fillers on color intensity and uniformity are also discussed.

Paolo Franchi, *Cellulosa e carta* (Rome) 8, No 9, 5-11 (1957) (original in Italian), through *Bull. Inst. Paper Chem.* 28, 615 (1958).

Degradation of cellulose in alkaline cooks

The degradations of native and mercerized cotton celluloses caused by alkaline digestions were studied. The temperature of the cooks was 170°C.

Improved methods were used in obtaining a correlation between the content in carboxyl and the degree of polymerization $(D.P.)_n$ of the products—the latter being determined by osmometric measurement. Calculations showed that approximately 0.66 carboxyl group per "molecule" of degraded cellulose was formed, and the conclusion was reached that these carboxyl groups were present as end groups where the so-called "peeling off" reaction is stopped. Apparently the end groups formed at points at which the reaction sets in are hydroxyls. Any aldehyde groups formed are rapidly attacked. The degraded cotton celluloses had very little (presumably a negligible amount of) carbonyl. The influence of oxygen on the cooking liquor appears to have no detectable influence on the relation between $(D.P.)_n$ and the carboxyl content. Calculations show that the number of glucose residues that enter solution for each rupture of the cellulose chain is independent of the $(D.P.)_n$ within a wide range. For native cotton this number is about 65; for mercerized cotton, the corresponding figure is 40.

The velocity constants for the degradation reaction were calculated. At least in the earlier stages of the cook, mercerized cotton is degraded more rapidly than is unmercerized cotton, but the reaction rate with mercerized cellulose becomes slower as the digestion proceeds. When a cook was carried to 6 hrs., the sample lost its fibrous structure almost completely. The mechanism and kinetics of alkaline degradation are discussed.

Two tables, four graphs and 23 references are given. Olle Franzon and Olof Samuelson. *Svensk Paperstidn* 60, 872-877 (1957) (in English).

Making better products . . . to make your products better

DISCOVERING MUCH MORE!

Norton laboratory researchers, numbering over 180 scientists and technicians, are constantly seeking to find out a great deal more about abrasives, pulpstones, and other grinding wheels. Their chief interest is in developing new abrasives, new bonds and improved grinding techniques. Their many successes in research of this nature have stepped up grinding progress to lower your grinding room costs.

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PULPSTONES

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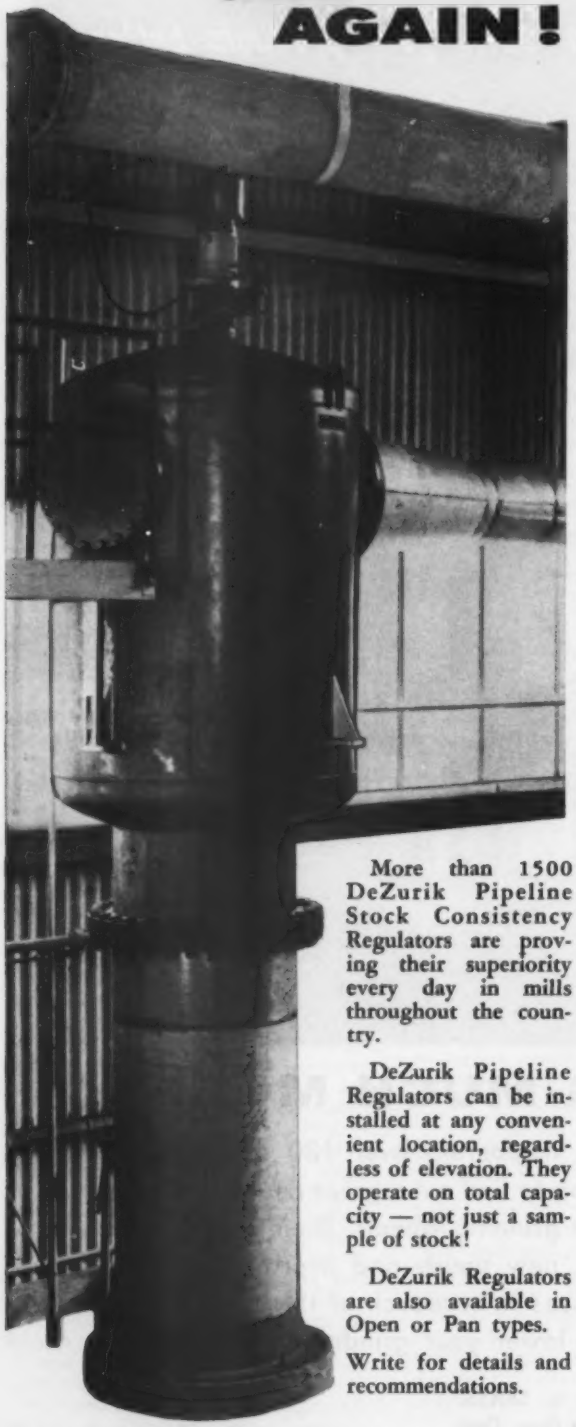

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DeZurik Regulators are also available in Open or Pan types.

Write for details and recommendations.

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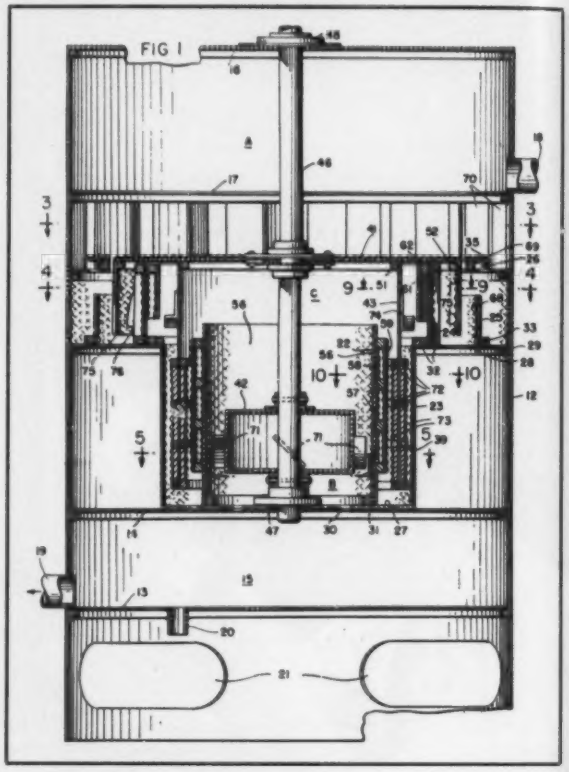
PATENT REVIEWS

MELVIN NORD*



Refiner apparatus for removing wax, tar, asphalt and plastic from paper pulp

U.S. 2,383,981 was to be issued June 17, 1958, to David A. Dent. This patent describes a machine for refining paper pulp that contains wax, tar, asphalt or plastic.

The essential concept of this invention involves relatively-rotating cylindrical elements disposed in a tank to form a circuitous passage between inlet and outlet ports. The opposed faces of the elements have various combinations and arrangements of pronged plates, strips and angulated fins fixed thereon to so further restrict the circuitous passage to accelerate the fibrillating of the cellulosic pulp entering the inlet port and, by gravitational and centrifugal forces, cause to traverse the passage for discharge from the tank outlet.

Suitable temperatures are from 150° - 175° F, standard paper mill chemicals are used in amounts of ½ - 2 per cent. Colored printing inks oxidize instantly. All other compounds are completely removed from paper fibers and can be washed out or reclaimed.

Removal of high-density paper stock or pulp from storage tanks

U.S. 2,768,697, issued July 9, 1957, to Robert M. Soden, provides means for diluting and removing high-density paper stock from large storage tanks.

The dilution is accomplished by means of a rotating nozzle head mounted in the bottom of the tank close to the bottom outlet. It contains an upper and lower nozzle and is piped up to deliver water into the tank at two levels.

Providing adequate rotating speed for the nozzle head, careful control and regulation of the rate at which the distributing water

*Patent attorney, 17600 Pinehurst, Detroit 21.

is delivered to the nozzle head and testing the consistency of the stock, from time to time the nozzle maintains an adequate rate of outflow of the stock, while at the same time excessive dilution can be avoided and the consistency maintained with reasonable and desirable limits.

Manufacture of chipboards

U.S. 2,817,617, issued December 24, 1957, to Hugh R. Rogers, describes a method for manufacturing re-aggregated wood or chipboards having outstanding dimensional stability.

An important object of the invention is to prevent the absorption of resin binder by the chipped-wood particles, since this tends to result in a consolidated board product characterized by its brittleness and by the relatively weak glue bond between the individual wood particles.

The wood chip particles are first wet by spraying so that the moisture content exceeds the equilibrium moisture content (about 6-12 per cent—preferably up to at least 25-90 per cent). Aqueous resin mixture is then added to wet out the wood particles and is thoroughly distributed on the chips by mixing. Substantially all the resin is thus retained on the surfaces of the wood particles and is thus available for binding the particles together. The resin-treated chips are then dried to their equilibrium moisture content by forced air drying with hot air. The moisture moves from the inside of the particles to the surface where it evaporates; this causes no disturbance of the resin deposited on the surfaces. The mixture is then consolidated in a hydraulic press.

Porous paper products

U.S. 2,810,644, issued October 22, 1957, to Howard E. Shearer and assigned to American Viscose Corp., describes a method of making porous paper products having high dry and wet strengths.

A water-insoluble alkali-soluble cellulose ether is dissolved in an aqueous alkaline solution containing 1-8 per cent of a strong alkali. This solution is mixed with water contained in the beater of a papermaking machine to disperse the ether in the form of very fine colloidal gel particles in the water in the beater. A predetermined quantity of papermaking fibers, at least 10 per cent by weight of which are non-fibrillating synthetic fibers having a length of from 1/32-13/32 in., is mixed with the resulting aqueous alkaline dispersion of the ether.

The fibers are deposited from the dispersion to obtain a paper product, which is then subjected to drying, heat setting and pressing to obtain a final product in which the non-fibrillating synthetic fibers are bonded together by the water-insoluble alkali-soluble cellulose ether that occurs in the product in discontinuous condition.

Maintaining brightness in high-density wood pulp

U.S. 2,822,236, issued Feb. 4, 1958, to Fred R. Sheldon, Robert L. McEwen and Carl E. Price, assigned to Food Machinery & Chemical Corp., describes a method of maintaining brightness in high-density wood pulp having a pH of 6-10 by adding hydrogen peroxide to it.

Approximately 0.02 to 0.25 per cent hydrogen peroxide by weight is present in the pulp. Such pulps may be stored or shipped, and after 4-6 weeks will still possess their original brightness.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Apparatus for making a multi-ply valve bag having an extended intermediate valve ply	St. Regis Paper Co.	2,818,003	12/31/57
Paper bag machines	Jesse B. Taylor Sr.	2,818,004	"
Machine for forming reinforcing ribs on container covers	Container Corp of America	2,818,005	"
Can carrier	Noble Andre	2,818,171	"
Carton with reclosable spout	Willard W. Wilson	2,818,207	"
Dryer for composite paper and veneer sheet material	General Box Distributors	2,818,660	1/ 7/58
Machine for making paper flower pots	James A. Kirk	2,818,788	"
Machines for forming fold lines in boards or sheets	Vickers-Armstrongs Ltd.	2,818,789	"
Paper coating machine	Westoak Machine Corp.	2,818,908	"

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HIGHEST QUALITY

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For Effective Removal of

RESIDUAL CHLORINE

Tennessee's Liquid Sulfur Dioxide is a most efficient and economical anti-chlor. Removes residual chlorine and other materials which cause color reversion or yellowing with age. It also eliminates excessive residual chlorine in water.

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Another

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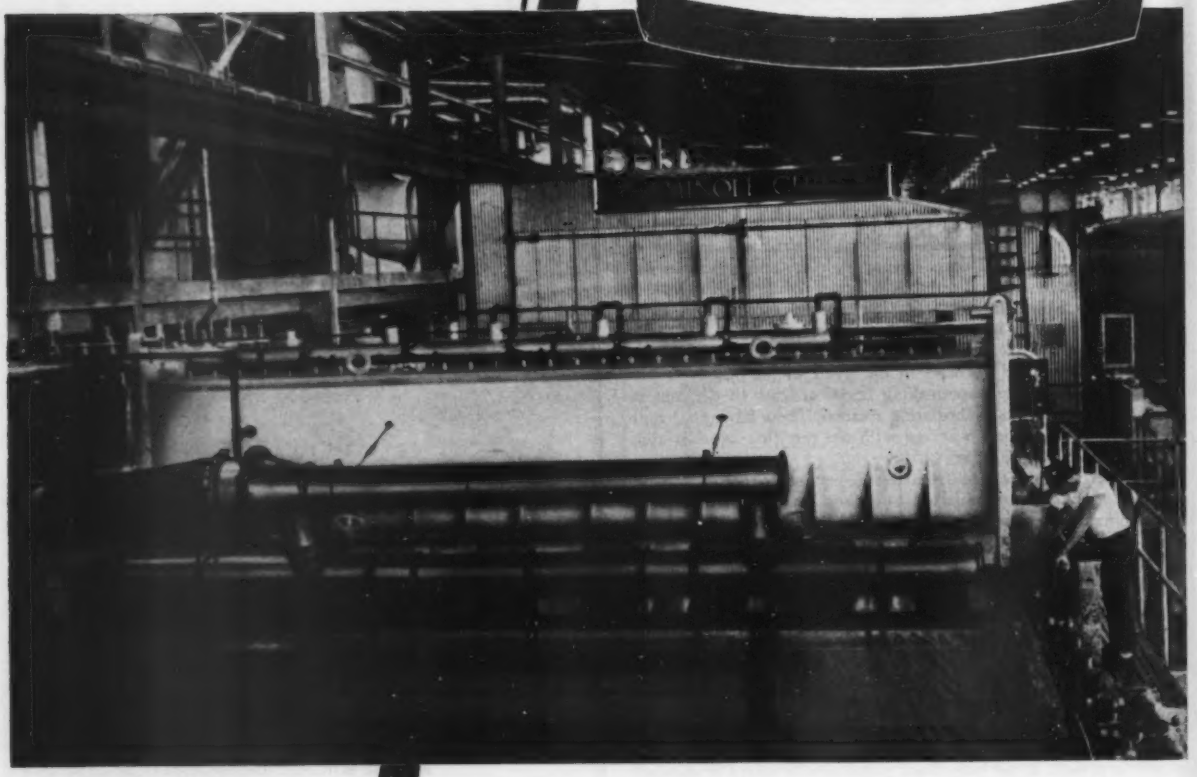
VALLEY

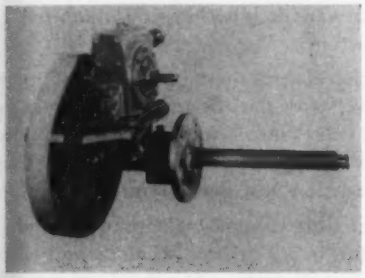


On.... St. Regis Paper Company's new giant paper machine at Jacksonville, Florida.

VALLEY IRON WORKS CO., APPLETON, WISCONSIN

NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.



Automatic pH sampling device

A continuous automatic pH sampling device called the IMPCO pH sampler is now being manufactured.

Designed primarily for quality control in making better bleached pulps, it also eleminates the expensive use of excess chemicals. The device is installed on any tower or pipeline containing 3 to 16 per cent density pulp, where it continually samples the moving mass of stock for chemical concentration tests.

Its sampling tube, which extends horizontally about 4 in. into the vessel, contains a specially-designed threaded shaft which both rotates and reciprocates. This action allows a continuous entrance of liquor into the tube where it is conveyed by another set of screw flights into the collection chamber. The drive consists of a 1/6-hp motor. The company welcomes your request for additional information. *Improved Machinery Inc.*

Circle No. 11 on Readers' Service Card

Hood for Yankee machines

A new SF Yankee hood will soon be available in this country. This hood is a self-contained unit with built-in circulation fans and heating units. The construction concept makes it possible for a more efficient air impingement on the paper, resulting in a considerable increased evaporation rate. *American SF Products Inc.*

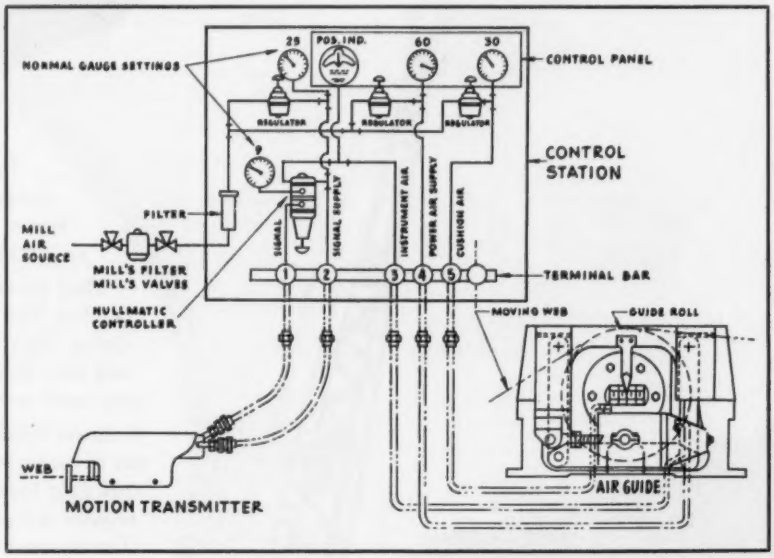
Circle No. 12 on Readers' Service Card

Ductile iron pipe fittings

A line of ductile iron pipe fittings including pipe lock couplings, screwed and flanged fittings and companion flanges has been announced.

The company recommends these fittings where structural strength and thermal shock resistance are specified. They are excellent for handling corrosive materials or chemicals. *Kuhns Brothers Co.*

Circle No. 13 on Readers' Service Card



Automatic air guide system

A new automatic air guide system that is said to react faster than mechanical guiding systems and gives more accurate control of the movement of wire and felt is now available.

Speed and sensitivity controls and the system itself are adjustable to the characteristics of almost any new or old paper machine. Operating air for the system is tapped from the mill's supply—a maximum pressure of 95 psi is required. The company invites your request for additional information. *Pusey & Jones Corp.*

Circle No. 15 on Readers' Service Card

Heavy-duty embosser

A heavy-duty embosser for controlled embossing for paper, board, plastic, wallboard, flooring and luggage is being manufactured.

The unit is of two-roll, calender-type construction and incorporates the main essentials for heavy-duty embossing. Wide ranges of widths, patterns and material thickness can be easily handled. *Black-Clawson Co., Dilts Div.*

Circle No. 14 on Readers' Service Card

Flexible nylon couplings

Now available to the market is a new lubrication-free nylon coupling. It is said to be completely corrosion-resistant. The chain element of the new coupling is constructed of nylon segments and stainless steel pins. It can be disassembled or connected at any link without special tools and fits standard stock steel roller chain sprockets.

The coupling handles loads from fractional to 40 hp and speeds from 500 to 5000 rpm. *Morse Chain Co.*

Circle No. 16 on Readers' Service Card

Yellow dye for paper

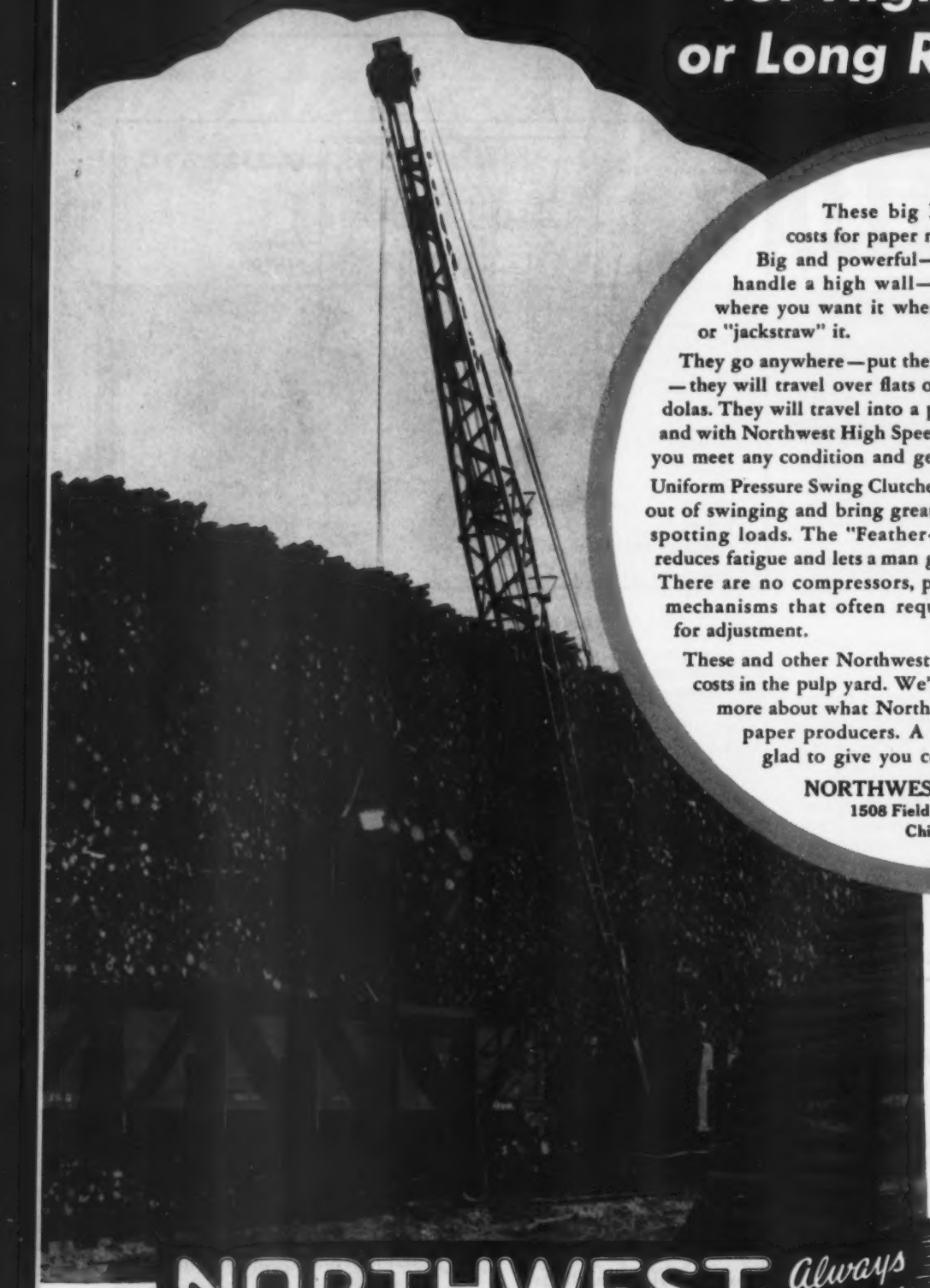
Trisulfon Yellow 8G Conc., a new dye just released to paper mills by Sandoz Inc., is recommended for several grades of paper including bonds, mimeos, etc., where a greening element is desired. *Sandoz Inc.*

Circle No. 17 on Readers' Service Card

Pipeline mixer for continuous homogenizing and mixing

Homogenizing and mixing on a continuous-flow basis is possible with a new pipeline Homo-mixer now being manufactured. The unit can be installed on existing

BIG and POWERFUL . . .
for High Piles or Long Reach!



These big Northwests are cuttin costs for paper mills all over the countr Big and powerful—plenty of boom here t handle a high wall—it puts the pulp woo where you want it whether you stack it regul or "jackstraw" it.

They go anywhere—put them on the cars if you wa —they will travel over flats or through drop-end go dolas. They will travel into a pile loading or unloadin and with Northwest High Speed Boom Hoist equipme you meet any condition and get maximum use of spac

Uniform Pressure Swing Clutches take the jerks and gra out of swinging and bring greater accuracy and safety spotting loads. The "Feather-Touch" Clutch Contr reduces fatigue and lets a man give his best all day lon There are no compressors, pumps or other delica mechanisms that often require special knowledg for adjustment.

These and other Northwest advantages mean low costs in the pulp yard. We'd like to have you kno more about what Northwests are doing for oth paper producers. A Northwest man will b glad to give you complete details.

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SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
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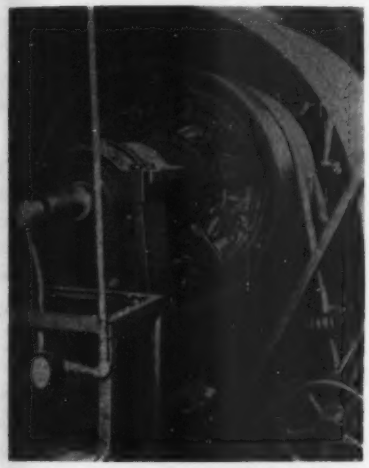
New Products . . .

pipelines or made up with standard I.P.S. fittings for use where a pipeline does not currently exist.

Mounted on a structural steel platform for portability and easy installation, it will combine mixtures of liquids, gases and solids that can flow through piping. *Gifford-Wood Co.*

Circle No. 18 on Readers' Service Card



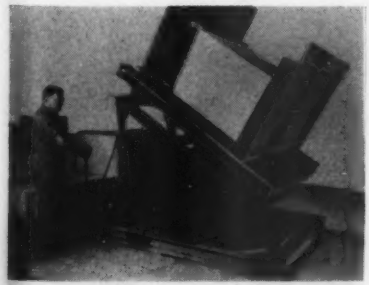
Cone pulley with air-operated clutch

Variable speed clutch pulleys are now being made with cone faces for paper machine drives. It is a clutch and pulley that can be slipped and inched during starting of the sections, removing wraps from dryers, etc. without overheating.

It allows the section to be brought up to speed gradually, and the heat generated by the clutch slipping is dissipated by the many cooling fins located between the clutch shell and the belt track.

The units come in torque ranges up to 192,000 in-lb. and cone sizes from 26 in. *Horton Mfg. Co.*

Circle No. 19 on Readers' Service Card



Skid turner

This unit has been developed to eliminate the costly process of turning whole skids of material by hand.

A skid is placed on the machine and with a push is completely turned. Only one man is needed to operate the unit.

The company states that the unit will handle stock up to and including 52 × 76 × 80 in. high and up to 6000 lb. in weight. More technical information on this machine is given in a bulletin now being offered by *Southworth Machine Co.*

Circle No. 20 on Readers' Service Card

New method for bundling pulpwood

A new method of bundling pulpwood for temporary storage in concentration yards has been developed.

The new method uses punched 1¼ × .035 heavy-duty Acme Steel strapping and a rectangular-shaped three-prong steel buckle. The principal advantage of this technique of bundling pulpwood stems from the fact that there is no bending, threading or unthreading of strapping. This results not only in faster application and removal, but also in a longer useful life of the bands. *Acme Steel Co.*

Circle No. 21 on Readers' Service Card

Brake

Stearns Electric Corp. has announced the availability of an Underwriter's-approved style UH76A-9 brake with a maximum torque rating of 105 lb.-ft. suitable for mounting on the NEMA "C" flange of motor frames 213 through 256 U. By use of an adapter, mounting on 284U and 286U motor frames is possible.

This latest addition to the Class I Group D line can be offered for floor or motor mounting, horizontal or vertical mounting, alternating current only. *Stearns Electric Corp.*

Circle No. 22 on Readers' Service Card

Machine load control

A rugged yet sensitive machine load control is designed to protect machinery and equipment through automatic shut-off, automatic warning and continuous on-off automatic operation.

The control protects against overload, underload, no-load and phase failure. *Tipptronic Inc.*

Circle No. 23 on Readers' Service Card

New additive

A new additive has been specially designed for pulp and paper mill operations. Labeled WR-301, the new product helps produce a better quality paper stock by eliminating foam and improving ash, pick and other properties.

Free samples of WR-301 are available on request. *Hodag Chemical Corp.*

Circle No. 24 on Readers' Service Card

Oven-balance combination

An oven-balance combination can eliminate guesswork as to how much moisture

MOST

COMPLETE STOCK OF

STAINLESS STEEL!

Never-before coverage and service! Only the new association between Power Stainless Products Co., Passaic, New Jersey, and Stainless Piping Supply, Inc., of Charleston, West Virginia, brings such complete and prompt service in corrosive-resistant materials. Now just one phone call to one source gets you everything you'll ever need in four major industrial areas! Write today on your company letterhead for your copy of the most complete catalog ever assembled within two covers.

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New Products . . .

is regained while a sample of paper or pulp is being transferred from oven to desiccator and weighed.

Modifications in balance and oven design enable the unit to bring the accuracy of an analytical balance and the heating capacity of a standard laboratory oven to this paper-drying application so common in paper plant laboratories. *Arthur S. LaPine & Co.*

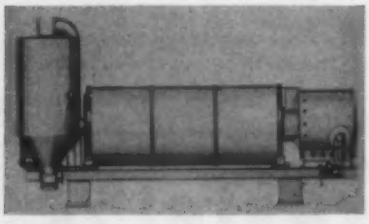
Circle No. 25 on Readers' Service Card

Centriscreen

Occupying only 2 sq. ft. of floor area, the Centriscreen provides 30 sq. ft. of screening surface in the form of two concentric, rigidly-supported, stainless steel screening cylinders. The screens remain stationary, and the stock flows down and inward through the inner screen, outward through the outer screen. The screen surfaces are kept clean and open by double hydrofoils, two for each screen cylinder.

The stock enters the Centriscreen tangentially through a 14-in. inlet so designed that heavy objects are trapped and removed. The stock enters the annular compartment between the screen cylinders, passes through the screen plates and to a 14-in. outlet. The rejected shives and dirt particles flow downward between the screen cylinders and are collected and removed through a 4-in. tailings outlet. *Bird Machine Co.*

Circle No. 26 on Readers' Service Card



Dryers

Production of two new dehydrators designed to bring extra drying economy to a wide range of products has been announced.

The large dryer is rated to evaporate 36,000 lb. of water per hour. The company has stated that this unit is particularly suited for paper pulp and wood products. *Arnold Dryer Div., Heil Co.*

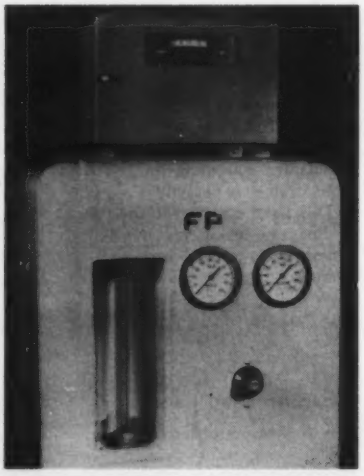
Circle No. 27 on Readers' Service Card

Chemical feed packaged unit

An improved chemical feed packaged unit has been specially designed to handle corrosive chemicals. It has been named the Bac-O-Feed.

Principal features of the new unit are a newly-perfected 50-gal. polyethylene tank with polyvinyl chloride fittings. It can be fitted with a stainless steel headed proportioning pump and PVC piping to suction the pump. Agitator is furnished with stainless steel shaft and propellor. No gauge glass is needed, because the white polyethylene tank is translucent, and liquid level is always visible.—*Bird-Archer Co.*

Circle No. 28 on Readers' Service Card



Pneumatic control chlorinator

A pneumatic control chlorinator (model 70C1415) which automatically proportions chlorine flow to primary flow has been announced.

The new chlorinator uses a compact ratio relay assembly which may be mounted either on the wall or on top of the chlorinator. The assembly, which serves as a dosage adjustment, receives a 3-15 psig linear signal from the flow transmitter and transmits another 3-15 psig signal to the chlorinator's pneumatic rate valve.

The company welcomes your request for more information on this new unit. *Fischer & Porter Co.*

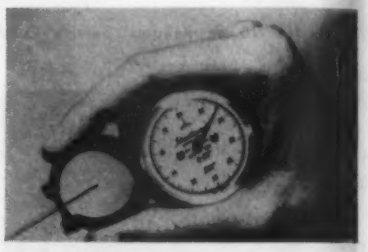
Circle No. 29 on Readers' Service Card

Electro-magnetic disc brake

A new style electro-magnetic disc brake called the DM brake has been designed for higher thermal capacity jobs. It utilizes special carrier rings to hold the friction linings.

The unit is designed for dc operation and is arranged for foot mounting for easier adaptation into many types of equipment. Torque ranges from 30 lb. ft. to 7500 lb. ft. This brake is spring-set, magnetically released for fail safe application. *Stearns Electric Corp.*

Circle No. 30 on Readers' Service Card



Dial caliper gauges

Known as the Quicktest dial caliper gauges, these precision instruments were designed for the measuring of the thickness of sheet metal, pipe walls, walls of cast specimens, profiles, grooves, rounds, threads, also of foils, cardboard, textiles, lumber, rubber and many other applications.

Four different shapes of contact points are available for various measurements as described above. The calipers are said to have accuracy absolutely calibrated to a reading of .001 in. *Bemax Import-Export Co.*

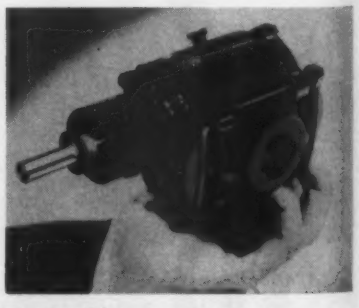
Circle No. 31 on Readers' Service Card

Polyethylene coating and laminating machine

Announcement has been made of a new model, PL-450, versatile machine designed for laminating extruded polyethylene film to paper, tissue, foil, fabric and cellophane for use primarily in the flexible packaging field.

The machine can be operated at speeds ranging from experimental to full commercial rates, making it applicable to leading pilot plant and development laboratories. *Black-Clawson Co., Dilts Div.*

Circle No. 32 on Readers' Service Card



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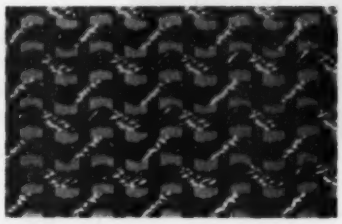

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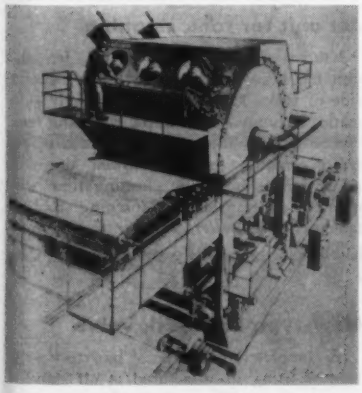
sives this new Ace GKF gear pump features all-hard rubber casing and gears, Kel-F bearings and rubber-covered shaft.

The company states that the Ace hard rubber compound used in this new pump is one of the most corrosion-resistant materials known. Self-lubricating, the hard rubber is also wear-resistant. The suction and discharge connections are tapped for 1-in. standard pipe. *Amerace Corp., American Hard Rubber Co. Div.*

Circle No. 33 on Readers' Service Card



Yankee hood

A new hood for Yankee machines that is said to radically increase the productive capacity has been introduced.

The new SF Yankee hood is a self-contained unit with built-in circulation fans and heating units. The new construction concept of the SF hood makes possible a considerably increased evaporation rate as well as the elimination of bulky air re-circulation duct work. *American SF Products Inc.*

Circle No. 34 on Readers' Service Card

Low-melt polyethylene resin

Epolene C, a recent introduction of a new low-melt polyethylene resin, will now enable converters and coaters to apply polyethylene directly to paper using conventional melt coating techniques and equipment with only slight modification.

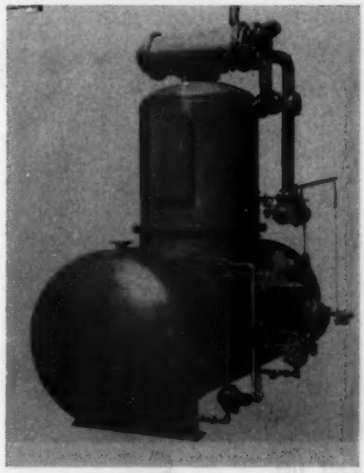
A number of successful plant runs having already been made, Epolene C can make it as easy and profitable to use it for paper coating as wax materials have been. *Eastman Chemical Products Inc.*

Circle No. 35 on Readers' Service Card

Burners for the industry

Ray Burner Co. has published a group of brochures describing the company's line of burners. Automatic water heaters, gas burners with full electronic control, power pressure burners for light oil, pressure burners for combination gas-oil and other type units are manufactured by the company. A condensed catalog is also available. The company welcomes your request for these bulletins.

Circle No. 36 on Readers' Service Card



Feedwater heater control

A new dual liquid level control with high- and low-water alarms for its line of feedwater heaters has been introduced by Stickle Steam Specialties Co.

The control is recommended for installations where the primary supply for make-

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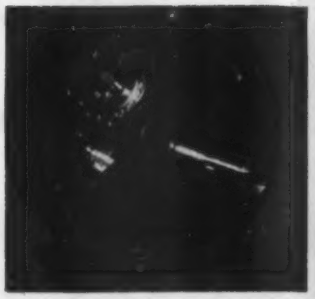


New Products . . .

up water is subject to interruption. In the event feedwater in the storage section reaches a pre-set low, an alarm sounds and the control automatically switches on the secondary water supply.

A different sounding alarm is actuated whenever a pre-set high point is reached in the storage section so that the trouble can be corrected promptly.

The control is available on all Stickle deaerating and non-deaerating feedwater heaters in the capacity range from 3000 to 300,000 lb. per hr. and with any desired storage capacity. *Stickle Steam Specialties Co.*

Circle No. 37 on Readers' Service Card

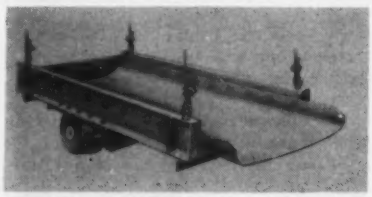
Roll lift

The Sure-Grip roll lift is a new device that is used for carrying paper rolls.

This device has many advantages over the conventional-type of handling. It saves storage space because the device permits storing of rolls side by side since no room is needed between rolls for pickup with grab truck, and core and roll damage is lessened because the serrated steel or rubber-covered leaves of the lift provide a non-slip grip on the roll core. The expanding force of the rubber tube assures uniform, positive contact with the inside of the core and permits no slip or twist in the lifting process.

The Sure-Grip roll lift will operate pneumatically or hydraulically and can be used either with a fork lift truck or an overhead crane. It is available in a range of sizes to fit cores from 2½-in. diameter up and is capable of lifting rolls to 6000 lb. in weight. *Tidland Machine Co.*

Circle No. 38 on Readers' Service Card



Vibrating feeder

A new vibrating feeder has just been introduced. It can be applied to the handling of a wide range of materials from heavy, sticky ores to light, dry grains. It consists of a trough and motorized vibrator drive mounted directly on a rugged channel frame.

The MC feeder is the name given to this unit. It can be cable- and spring-suspended under a hopper or spring-mounted on supports from the floor. Twelve sizes are being stocked by the company. *Link-Belt Co.*

Circle No. 39 on Readers' Service Card

Temperature controller

A versatile direct-dialing Model 71 YSI Thermistemp temperature controller is now available.

Utilizing thermistor probes as sensing elements, this controller can be set to any desired temperature from −6°C to +124°C directly, and the control point will be within an accuracy of ±9.5°C of the desired temperature.

Probes for the unit are available for control sensing in liquids, in gasses, on surfaces and in semi-solids, including a 22-gauge hypodermic needle sensing probe. *Yellow Springs Instrument Co. Inc.*

Circle No. 40 on Readers' Service Card

Jet unit for tank cleaning

Known as the Sellers Rotor Jet, this unit has been designed for cleaning the inside of tanks. Operation is completely automatic. Personnel need never enter the tank.

The jet movement can be speeded up for rapid cleaning jobs or slowed down to allow longer hydraulic cleaning time with greater heat transfer for loosening stubborn tank deposits. *Sellers Injector Corp.*

Circle No. 41 on Readers' Service Card

New-type bar stock valve

A completely new type of bar stock valve is now being manufactured in all standard sizes to 1 in. This valve utilizes the Veegroo tapered orifice principle, which is designed to eliminate clogging problems. Pressure ratings for the new stock valve are 3000 and 10,000 psi. Materials avail-

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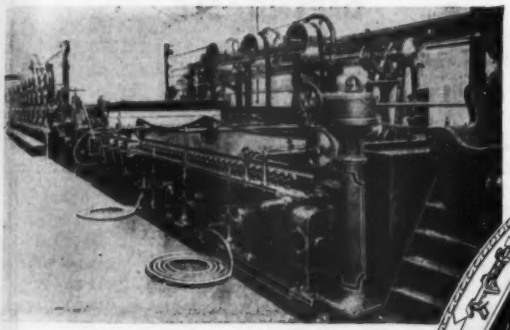

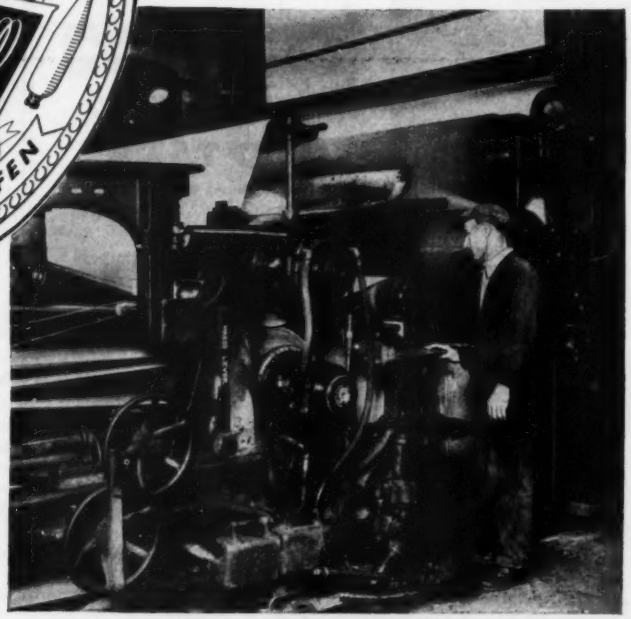

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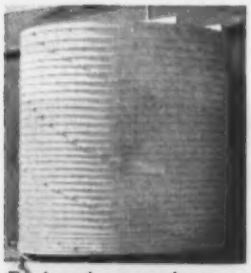

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New Products . . .

able are carbon steel, 303, 316 or 416 stainless steel, Alloy 20, Monel and aluminum. *General-American Valve Co.*

Circle No. 42 on Readers' Service Card

Steam heating mixer

Here is a new concept of steam mixing. The mixer incorporates a single through shaft with curved mixing arms or paddles installed in an inclined housing. The mixer inlet and outlet are arranged in a straight line, stimulating vertical pipeline flow. The pulp is retarded in this downward flow by a series of alternate horizontal shelves or trays. Steam inlets are located adjacent to these shelves.

Mixing is accomplished by the repeated action of the paddles sweeping the pulp from shelf to shelf across paths in incoming steam for complete and rapid dispersion.

The units are V-belt-driven from 30-hp 900-rpm motors, which are supported on integral adjustable bases. Units now in operation rated a capacity of 200 tons per day of high-density pulp. However, the company offers these units for various production requirements including a 500-tons-per-day model. *Improved Machinery Inc.*

Circle No. 43 on Readers' Service Card

Glass fiber pipe covering

Therma-K is a new glass fiber pipe covering used for insulating hot and cold water piping, low-pressure steam lines and refrigerant lines.

Designed for applications where temperatures range from sub-zero to 350°F., the mat is tightly rolled, layer on layer, in such a way that upon thermosetting the mat springs back like sponge, leaving countless dead air spaces between laminations.

Therma-K is available in 3-ft. sections. Sections can be supplied in a range of wall thicknesses for iron pipe sizes from ½—12 in. and for copper tubing from ½—3 in. *Ebret Magnesia Mfg. Co.*

Circle No. 44 on Readers' Service Card

Non-toxic germicide

Dioxcide, a new non-toxic germicide for the pulp and paper industry, has been approved by the Bureau of Explosives of the Association of American Railroads for shipment as a corrosive liquid n.o.s. under I.C.C. regulations.

The product is being introduced to the pulp and paper industry for a variety of uses where microbiological infection is harmful to production. Uses include treatment of fresh and white water systems, preservation of pulps, starch and other additives and reduction of odor-producing compounds. Additional uses are under investigation by a number of paper mill and independent laboratories. *Chemical Research Laboratories of America Inc.*

Circle No. 45 on Readers' Service Card

Water-dispersible defoamer

Nopco 1497-B, a water-dispersible defoamer, is now available for protein-pigment paper coatings. It is a firm white paste that promotes even coatings, deaerates heavy coating colors and stabilizes color viscosity. *Paper Chemicals Div., Nopco Chemical Co.*

Circle No. 46 on Readers' Service Card

NEW LITERATURE

Books

FUNDAMENTALS OF THE BEATING PROCESS. By H. W. Emerton. Published by British Paper & Board Industry Research Association, St. Winifred's Laboratories, Welcomes Rd., Kenley, Surrey. 198 pages. Price: $6.00.

This book has been written in two parts. Part I deals with the mechanical treatment of pulp fibers during their preparation for papermaking. For a full understanding of the fundamental basis of this operation a knowledge of the chemical and structural properties of papermaking fibers is required. This is also covered in Part I.

Part II is devoted to the historical approach that leads up to the present day theory of the beating process. Subsequent chapters deal with factors affecting the beating behavior of pulps and methods of measuring the progress of the operation.

Illustrations of light and electron micrographs and line drawings are given throughout the volume.

Booklets

ETHYLENE OXIDE BASED SURFACE ACTIVE AGENTS. Reprints of this symposium given at the 43rd mid-year meeting proceedings of the Chemical Specialties Manufacturers Association are now available.

The reprint is bound in a heavy-weight cover and presents all the material presented at the symposium.

Prices for the reprint are $1.00 per copy, 50c per copy for 10 copies at one time and 25c per copy for 50 or more copies at one time.

Orders should be sent to the Chemical Specialties Manufacturers Association, 50 East 41st St., New York 17, N. Y.

CONVEYOR TERMS AND DEFINITIONS. Book No. 101 has been announced as an up-to-date and enlarged edition of an earlier publication.

This 96-page book defines more than 1200 conveyor types, parts and related equipment. Preferred terms are accompanied by the definition, and other commonly-used terms are related to them by an extensive system of cross-indexing.

The book is available by writing to: Conveyor Equipment Manufacturers Association, No. 1 Thomas Circle, Washington 5, D.C. Price: $2.00.

USDA Reports

SILVICAL CHARACTERISTICS OF CHERRYBARK OAK. Cherrybark oak is also known as bottomland red oak, Elliot oak, red oak, swamp red oak and swamp Spanish oak. This report by Thomas Lotti of Santee Research Center is another in the series of silvical characteristics studies made by the Southeastern Forest Experiment Stations, Asheville, N. C. For free copies of this report, write to Joseph F. Pechanec, Director.

SILVICAL CHARACTERISTICS OF WHITE SPRUCE. Hans Nienstaedt, in this report, has outlined the silvical characteristics of white spruce. He has covered subjects such as distribution, habitat conditions, life history, special features, races, hybrids and other genetic features. This report is available from M. B. Dickerman, Director, Lake States Forest Experiment Station, St. Paul Campus, University of Minnesota, St. Paul 1, Minn.

SILVICAL CHARACTERISTICS OF SLIPPERY ELM. Here is another report in a series of studies of silvical characteristics of major timber species. This report by Harold F. Scholz gives the study of the slippery elm. Copies of this report are available from M. B. Dickerman, Director, Lake States Forest Experiment Station, St. Paul Campus, University of Minnesota, St. Paul 1, Minn.

ARE WE WINNING THE FIGHT AGAINST TREE DISEASES? Reprints of this article, which appeared in The Forest Farmer XVII (2): November 1957, are available from Southeastern Forest Experiment Station., Asheville, N. C. The author, George H. Hepting, highlights the research that is being done to help win the fight against tree diseases.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Questions and answers on foreign licensing

Pegasus International Corp. is offering a booklet designed to help the business executive gain a working knowledge of the problems of foreign licensing and to serve as a guide in avoiding its pitfalls. In question-and-answer form, the booklet presents the advantages and disadvantages of licensing. It goes into such practical prob-

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by H. Witcoff
Director of Chemical Research, General Mills Inc.

and A. W. J. Dyck
Editorial Director, The PAPER INDUSTRY

The latest developments in the technology of paper coating are brought to the reader clearly and concisely in this new book that is based with some revision on a series of articles appearing in The PAPER INDUSTRY from May 1956 through May 1957.

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This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

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New Literature . . .

lems as selecting the proper partner, the importance of securing patents and many other such problems.

Circle No. 47 on Readers' Service Card

Dryer

American SF Products Inc. has described the new Flakt Dryer in a bulletin just published. This unit will soon be installed in an American mill. The Flakt Dryer is manufactured by AB Svenska Flaktfabriken, Stockholm, Sweden, and will be delivered by American SF Products.

Circle No. 48 on Readers' Service Card

Lightweight aggregate concrete

Master Builders Co. is offering a newly-published brochure illustrating the wide use of lightweight aggregate concrete in modern construction. Photographs and job stories present a clear picture of the wide variety of uses for this relatively new and versatile building material.

Circle No. 49 on Readers' Service Card

Valves

Lunkenheimer Co. describes the company's newest valves in a two-page circular. This circular, fully illustrated, describes the new engineering features and performance of the two types of forged steel gate valves.

Circle No. 50 on Readers' Service Card

Ceramic grate magnet

Stearns Magnetic Products Div., Indiana Steel Products Co., has published a bulletin describing the company's new Indox Grate Magnet for tramp-iron removal. Performance advantages of this new grate magnet over ordinary permanent magnet types are also discussed.

Circle No. 51 on Readers' Service Card

Centrifugal precipitator

American Air Filter Co. Inc. is issuing a bulletin describing the AAF skimmer, a centrifugal precipitator. The bulletin includes drawings and photographs which show the AAF Skimmer construction, dimensions and different arrangements.

Circle No. 52 on Readers' Service Card

Cone-type dry feeders and wet reagent feeders

Denver Equipment Co. has published a 4-page bulletin showing the company's Model 12-A Denver wet reagent feeders and cone-type dry feeders. The bulletin shows construction features of the units.

Circle No. 53 on Readers' Service Card

Handling and storage system for paper rolls

Elwell-Parker Electric Co. welcomes your request for a case history report which covers the activities of the company's handling and storage system.

Circle No. 54 on Readers' Service Card

Mechanical-drive turbines

General Electric Co. gives more than 10 power requirements in the pulp and paper industry which can be met by the company's high-speed mechanical-drive turbines in a new publication now available.

Circle No. 55 on Readers' Service Card

Flexidyne dry fluid drives and couplings

Dodge Mfg. Corp. has announced a new development in the company's line of Flexidyne dry fluid drives and couplings. This development is a fractional horsepower unit incorporating all the advantages found in the larger sizes. A bulletin now released from the company tells the story of this new line.

Circle No. 56 on Readers' Service Card

Demineralization

Graver Water Conditioning Co. announces the availability of a newly-revised and enlarged bulletin on demineralization. It includes comprehensive comparison charts and general construction.

Circle No. 57 on Readers' Service Card

Industrial roll catalog

Rodney Hunt Machine Co. has published a new industrial roll catalog and buyer's guide. The catalog and buying guide furnishes detailed information about the engineering, construction and application of all types of wood, rubber, metal and plastic rolls. Extensive data are also included as a guide in the selection and maintenance of industrial rolls.

Circle No. 58 on Readers' Service Card

Two-drum winder and rewinder

Appleton Machine Co. introduces a new brochure listing all of the standard available combinations for its two-drum winder and rewinder. Also explained are the many combinations of custom-built winders that can be obtained by interchanging the various components.

Circle No. 59 on Readers' Service Card

Corrosion-resistant fastenings

H. M. Harper Co. has published a net price catalog containing complete listings of all sizes of every standard item in the line of corrosion-resistant fastenings which are available for shipment from the plant. Copies of the catalog are available at your request.

Circle No. 60 on Readers' Service Card

Rubber expansion joints and flexible pipe

General Rubber Corp. has released a 6-page bulletin giving complete information on its new line of rubber expansion joints and flexible pipes.

Circle No. 61 on Readers' Service Card

The Paper Industry

Professional and Business Services

Pulp and Paper Specialists

CALKIN & BAYLEY, INC.

Industrial Consultants

30 East 41st St., New York 17, N. Y.

Lexington 2-1954

MILL COGS

We make a specialty of "Ready Dressed" cogs which are READY TO RUN the moment driven and keyed. Write for circular "O" and instruction sheets free.

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WANTED: One 5000KVA, 57Kv Delta 2300 Delta, 3 phase 60 cycle, oil filled air cooled transformer, with 2-2½ tap above and below. 7.27% Z. provision for future fans desirable. Reply to box 665, The Paper Industry.

NEW! REFINER — DEWAXING — DEINKING

Are you interested in a new refiner, dewaxing or deinking? See U.S. Patent 2,838,981 in this issue. Write David A. Dent, 750 Brompton Avenue, Chicago 13, Illinois.

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Patented automatic safety calender stack threaders, proven in actual mill feed operation of stacks. Unusual opportunity.

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2390 Fernwood Alton, Illinois

Excellent opportunity for technical man with paper mill experience to call on mills as sales service representative for established chemical company. Salary based on knowledge and experience. Reply giving education, experience and background to Box 668, The Paper Industry.

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To take full charge of production of lightweight specialties in New England mill with two cylinder machines. Age 35 to 45. Extensive papermaking background required. Reply to Box 669, c/o The Paper Industry.

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1958 PULP and PAPER MAP
NOW AVAILABLE

New wall-size map of the pulp and paper industry of the United States; size 42" X 58" printed in black and two colors, containing an indexed list of all active pulp and paper mills in the United States showing their products and daily capacities in tons.

Price: $7.00 prepaid with order

Published by
FRITZ PUBLICATIONS, INC.
431 South Dearborn Street
Chicago 5, Illinois

RES-LIN *wire saver*
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offers these features:

1. Even distribution of fabric assures EVEN WEARING.
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1222 Linwood Ave.
Norristown, Penn.
Norristown, Pa.

SOUTHERN REPRESENTATIVE
Horace Hill
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Pensacola, Fla.

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APPLETON, WIS.

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FOR CHIPPER—HOG—PAPER—VENEER KNIVES — ROTARY CUTTERS — DOCTOR BLADES — SHEAR BLADES, ETC

MODEL AK AUTOMATIC

EXTRA HEAVY DUTY Traveling Wheel Type
Capacity— 84" to 396"
Motors— 7½ to 40 HP
Speeds—10' to 100' and faster
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We Guarantee our Machines to Deliver the Maximum in Precision Ground Knives per Hour with the Finest and Sharpest Edges for Longer and Better Cutting Action

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HEAVY DUTY Traveling Table Type
Capacity — 32" to 196"
Motors — 5 - 7½ - 10 - 15 HP
Table Speeds — Hydraulic (10' to 80' per min.); Mechanical (Constant)
Gears — Hardened
Bearings — Ball and Roller Types
TABLE DRIVES
Mechanical
Hydraulic
Electrical
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MODEL "DN" — For normal knife requirements — Sizes — 32" to 108"; Motors — 3 - 5 HP; Wheels — 10" to 14" Diameter — also Straight Wheel and Circular Knife Grinders

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PORTLAND 1, OREGON

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PROJECT: No. 458

DATE:

REQUEST FOR SERVICE

COMPANY REQUESTING SERVICE:

PURPOSE:

EQUIPMENT:

FORMULATIONS:

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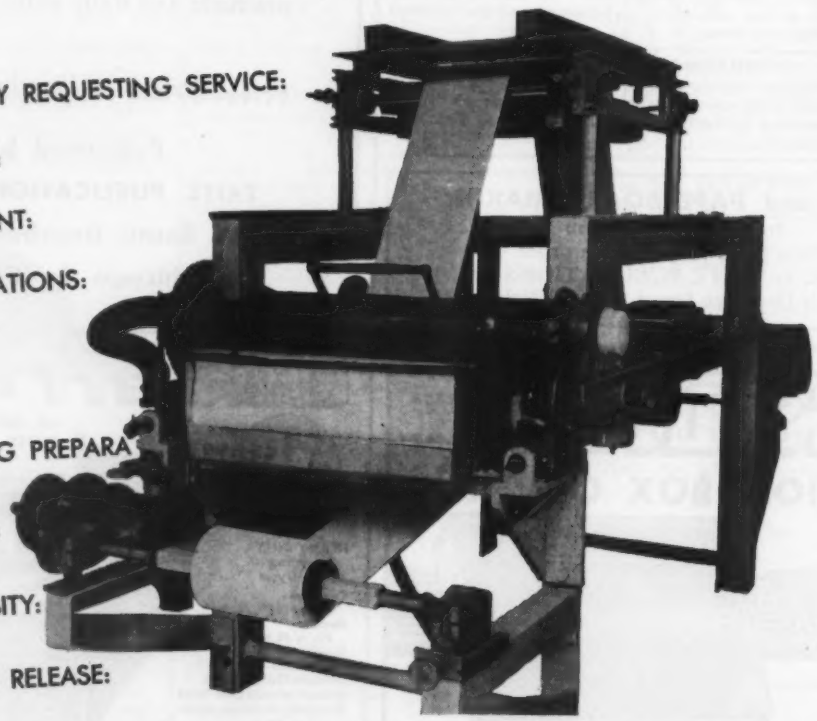

Georgia Kaolin Company's pilot plant coaters have aided many paper mills in determining the suitability of their raw stock for coating with various types of equipment.

Among the units in this Company's research laboratories are an air knife coater; a roll coater with reverse rolls, squeeze rolls and trailing blade; and a supercalender. Experimental trial runs on this equipment provide valuable information to paper coaters, and often save the time and cost of numerous trial runs at the mill level.

For full information regarding GK Research Service, contact the Paper Coating Laboratory, Georgia Kaolin Company, Elizabeth, N. J.

Georgia Kaolin Clays

Coating*	Filler**
Premax	Superwhite
Premier	Standard Water-Washed
XCS	W.P.
XHC	
262	Standard Air-Floated

*Available in spray dried, pulverized, lump and slurry form.
**Available in pulverized and lump form.

GEORGIA KAOLIN COMPANY

Sales and administrative offices—433 N. Broad Street, Elizabeth, N. J.

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.70— .75
No. 2 roofing (Chicago)	.50— .55
Twos and blues, repacked	1.50— 1.75
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

per cwt.

New dark cuttings
New mixed cuttings
New light silesias
Light flannelettes
Unbleached cuttings
New white cuttings
New light oxfords
New light prints
} Nominal

Old Rags

per cwt.

No. 1 white linens
No. 2 white linens
No. 3 white linens
No. 4 white linens
No. 1 white cottons
No. 2 white cottons
No. 3 white cottons
No. 4 white cottons
Extra light prints
Ordinary light prints
Medium light prints
Dutch blue cottons
French blue cottons
French blue linens
Checks and blues
Linsey garments
Bark cottons
Old shopperies
} Nominal

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	4.75— 5.00
Gunny No. 1, foreign	4.50— 5.00
No. 1 manila rope, domestic	6.00— 7.00
No. 1 manila rope, foreign	5.00— 6.00
New burlap cuts (soft)	6.00— 6.50
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	90.00—100.00
No. 1 hard white shavings	25.00— 30.00
No. 1 soft white shavings	45.00— 50.00
Soft white shavings, uncoated	45.00— 55.00
Fly leaf shavings No. 1	15.00— 20.00
Fly leaf, woody, No. 1	17.00— 22.00
Mixed colored shavings	15.00— 17.00
No. 1 books and magazines	13.00— 14.00
Ledger stock, white, No. 1	35.00— 37.50
Ledger stock colored, No. 1 (Midwest ship)	25.00—
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	60.00— 65.00
Colored tab cards	45.00— 55.00
New northern kraft envelope cuttings	55.00— 60.00
Triple sorted kraft, 100%	25.00— 30.00
No. 1 old kraft	25.00—
White news cuts, No. 1	40.00— 45.00
No. 1 overissue news	14.00— 16.00
Folded news, special	12.00— 13.00
Folded news, ordinary	10.00— 11.00
Old corrugated boxes	19.00— 20.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	6.00— 7.00
No. 1 mixed paper	3.00— 4.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	60.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	115.00—
L. c. l., ton	125.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00— 12.00
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.15—
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb.	.29⅜—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb.	.13¼—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	9.05—
N	9.20—
WG	9.70—
WW	9.80—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	7.80—
N	7.90—
WG	8.25—
WW	8.50—
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.54—
Pearl, 100-lb. bags, cwt.	7.39—
Powdered, 100-lb. paper bags, cwt.	7.51—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—
High-tinting, drums, c. l., lb.	.14⅜—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	.155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	.135.00—
Unbleached sulfite, Canadian	.135.00—
Bleached soda	.150.00—
Bleached soda, Canadian	.150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	.157.00—
Kraft, bleached southern	.160.00—
Kraft, bleached Canadian	160.00—162.50
Kraft, unbleached southern	.120.00—
Kraft, unbleached, Far West	.125.00—
Kraft, unbleached Canadian eastern	.135.00—
Kraft, unbleached Canadian western	.120.00—125.00
Kraft, semi-bleached southern	.140.00—
Sulfite screenings	—
Sulfate screenings	—
Groundwood, dom.	82.50— 90.00

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	.155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	.155.00—
Bleached sulfite, Finnish, freight allowed	.155.00—
Uubleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	.135.00—
Kraft, unbleached, Swedish, freight allowed	.125.00—
Kraft, unbleached, Finnish, freight allowed	.125.00—
Kraft, bleached, Swedish, on dock	.157.50—162.50
Kraft, bleached, Norwegian	.155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	.107.50
News vat lined chip	.110.00
.009 chip, rolls	.100.00
Filled news	.111.50
Solid news	.114.50
White vat lined chip	.144.50
Chip tube and can stock	.112.50
Single manila lined chip	.162.50
Single jute lined chip	.147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	.175.00
.018	.177.50
.016	.182.50
Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials
Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	8.50
60-lb.	8.75
50-lb.	9.00
40-lb.	9.25
35-lb.	9.75
30-lb.	10.50
25-lb.	11.25
20-lb.	12.25
No. 1 Kraft Butcher — Pink	per cwt
40-lb. only	10.00
(Sheets — Plus 50c cwt)	

Necrology . . .

(Continued from page 191)

following a stroke. He joined Dexter in 1921 as advertising manager and soon assumed responsibilities in the sales operations. He became a vice president in 1930 and a director in 1934.

Joseph M. Towne, 82, retired head of National Blank Book Co. of Holyoke, Mass., died in April. He joined the firm in 1912 and retired in 1953 after serving as both president and chairman of the board.

Orland R. Sweeney, retired head of the Department of Chemical Engineering at Iowa State College, died in April at his Ames, Iowa home after a long illness. He was 76. Sweeney was prominent for the development of processes for the utilization of agricultural residues in the manufacture of wallboard and insulation. He also held patents on water-softening processes.

Charles H. Knight, 81, one of the founders of Paper Makers Chemical Co., died recently at his home near Phillipsburg, N .J. He had been vice president of Paper Makers Importing Co. of Easton, Pa., successor firm to the chemical company, and had served on its board of directors until 1957.

Henry Jahnke, 64, assistant secretary and purchasing agent for Appleton Wire Works Inc., died May 15. He had been on the staff of the firm 45 years.

Hamilton Garnsey Jr., 56, vice president and general manager of Goulds Pumps Inc. at Seneca Falls, N. Y., died in April following a brief illness. A 1923 engineering graduate of Cornell University, he joined Goulds Pumps shortly after graduation and had been associated with the firm continuously since that time. He served as works manager for many years, was named a director in 1932 and had been vice president since 1938.

James D. Glenn, 52, formerly vice president and general manager of sales for Crucible Steel Co. of America, died May 8 following a long illness. Active in the steel sales field since 1922, he joined the Crucible staff in 1948 in Pittsburgh as general manager of stainless steel sales and was named general manager of sales in 1954. He was elected vice president in 1955 and retired in 1957 because of ill health.

Pipe, fittings, valves and pumps

(Continued from page 162)

Lead-lined steel pipe can be obtained in random lengths with plain ends or with flanged ends with the flange faces lead-covered at the factory. Lead-lined steel pipe can be cut using mechanical means such as sawing or using pipe cutters. Flame cutting is not possible since the lead lining would be damaged by the heat.

Screwed-on flanges are used, and if the pipe is not factory-flanged the face of the flanges must be covered with sheet lead with the lead lining and lead flange covering fused together.

No welding can be done on lead-lined steel pipe, and care must be exercised to assure against damage to the lead lining.

Clay and concrete pipe

All pulp and paper mills require piping for water supply, process waste, sanitary waste and storm drainage. The process waste, sanitary waste and storm drainage is almost exclusively handled in some type of concrete or clay pipe. Frequently the water supply is handled in concrete pressure pipe.

Clay pipe is manufactured in accordance with ASTM Specifications C13, C200, C261 and C278. Concrete sewer pipe is manufactured in accordance with ASTM Specification C76. Concrete pressure pipe is manufactured in accordance with ASTM Specifications C361 and C362.

Both clay and concrete pipe are available in a wide range of sizes and pressure classes. In addition to the above, clay and concrete pipe is becoming available with plastic compression types of joints that reduce the labor required for installation, and reinforced concrete pressure pipe is available in pre-stressed and steel and tile-lined forms.

Other piping materials not mentioned

The piping materials mentioned in Part I cover practically everything presently used in the pulp and paper industry. Some of the materials not mentioned will probably be used with increasing frequency in the future. There are still many services that present operating conditions that are not satisfactorily served by the presently available materials. Also, since piping is an item of such great expense to the pulp and paper industry, cheaper materials than the ones now used will be welcomed. However, substitutes for the presently available materials should be developed with the idea of reliability as well as cheapness. In the future, a reinforced plastic material will probably be developed that will be superior to any of the present materials and at the same time be cheaper. This "wonder" material is not yet in existence.

Appendix "A"

As mentioned in the preface, the following list comprises some of the reference sources that are convenient for use in piping engineering:

"Piping Handbook" by Sabin Crocker, McGraw-Hill

"Design of Piping Systems" by M. W. Kellogg Co., John Wiley & Sons Inc.

"Piping Design & Engineering" by Grinnell Co. Inc.

"Code for Pressure Piping", ASA B-31.1

"ASME Boiler & Pressure Vessel Code", Part I—Power Boilers

"ASTM Standards", Parts 1 and 2

ASA B16.1 — Cast Iron Pipe Flanges and Flanged Fittings—Class 125

ASA B16b — Cast Iron Pipe Flanges and Flanged Fittings—Class 250

ASA B16b2 — Cast Iron Pipe Flanges and Flanged Fittings—25-lb.

ASA B16.3 — Malleable Iron Screwed Fittings—150-lb.

ASA B16.4 — Cast Iron Screwed Fittings—125- and 250-lb.

ASA B16.5 — Steel Pipe Flanges and Flanged Fittings

ASA B16.9 — Steel Butt Welding Fittings

ASA B16.10 — Face-to-Face Dimensions of Ferrous Flanged and Welding End Valves

ASA B16.11 — Steel Socket Welding Fittings

ASA B16.12 — Cast Iron Screwed Drainage Fittings

ASA B16.14 — Ferrous Plugs, Bushings and Locknuts

ASA B16.15 — Brass or Bronze Screwed Fittings—125-lb.

ASA B16.17 — Brass or Bronze Screwed Fittings—250-lb.

ASA B16.18 — Cast Brass Solder Joint Fittings

ASA B16.19 — Malleable Iron Screwed Fittings—300-lb.

ASA B16.20 — Ring Joint Gaskets and Grooves for Steel Pipe Flanges

ASA B16.21 — Nonmetallic Gaskets for Pipe Flanges

ASA B16.22 — Wrought Copper and Wrought Bronze Solder Joint Fittings

ASA B16.23 — Cast Brass Solder Joint Drainage Fittings

ASA B16.24 — Brass or Bronze Flanges & Flanged Fittings

ASA B16.25 — Butt Welding Ends

ASA B18.2 — Square and Hexagon Bolts and Nuts

ASA B36.10 — Wrought Steel and Wrought Iron Pipe

ASA B36.19 — Stainless Steel Pipe

ASA B1.1 — Unified and American Screw Threads

ASA B2.1 — Pipe Threads

ASA A40.8 — National Plumbing Code

All ASA and ASME items can be obtained from:
The American Society of Mechanical Engineers,
29 West 39th St., New York 18, N. Y.

All ASTM items can be obtained from:
The American Society for Testing Materials,
1916 Race St., Philadelphia 3, Pa.

In addition to the above, a number of standards and technical bulletins on piping can be obtained from:
Pipe Fabrication Institute
Room 759, 1 Gateway Center
Pittsburgh 22, Pa.
and from:
Manufacturers Standardization Society
of the Valve and Fittings Industry
420 Lexington Ave., New York 17, N. Y.

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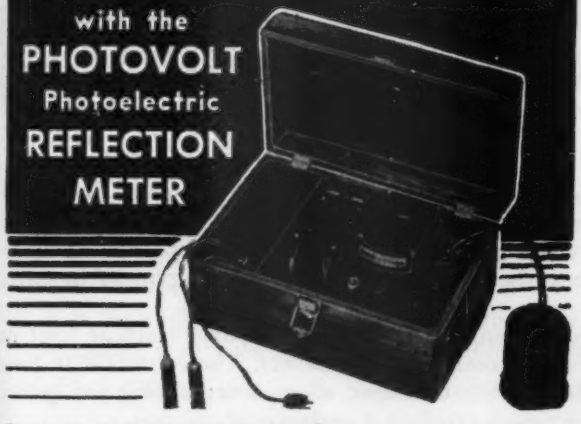

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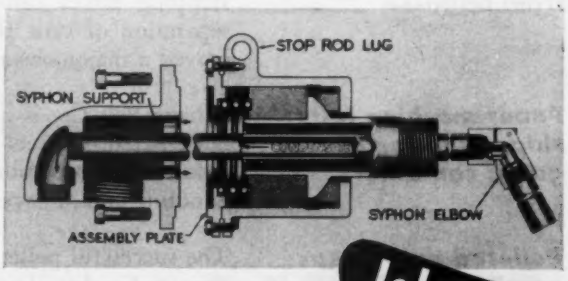

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It is also interesting to note that heating is selectively directed to the wetter spots of the web — since water, being a better conductor, allows more current to pass through these spots — with the result that the sheet emerges with a more uniform moisture content.

A new latex for paper coatings

A new styrene butadiene latex with a high (80-per cent) styrene content has been developed by Koppers Co. Inc. The latex shows gloss and surface characteristics in paper coatings that were formerly associated only with coatings produced on a cast coater. Gloss readings have been reported in excess of 95 — without excessive supercalendering.

The films formed from this latex are clear, continuous, colorless, free of odor and taste and show excellent grease resistance. The latex lends itself to coating formulations designed for conventional on-machine high-speed coaters.

Quality boxboard from bagasse

USDA scientists at Peoria, Ill., have demonstrated that durable corrugated shipping boxes can be made from bagasse. New refinements in screen separation of cane fiber and pith, developed at Peoria, appear to have removed a major obstacle to the economical and effective pulping of bagasse.

Paper machine felts shipped in corrugated containers

Albany Felt Co. is now shipping 70 per cent of its paper machine felts in new, patented, steel-strapped corrugated containers. These containers provide better protection for the felt in transit, allow easier storing and better handling and offer perfect moth-proofing if undamaged.

Pelleted pulp opens new horizons

The successful pelleting of wood pulp has been announced by Sprout, Waldron & Co. Inc. The pelleted pulp, it is claimed, has approximately 50 per cent more fiber per cubic foot than baled pressed pulp at 35-per cent consistency. This means that shipping volume can be reduced by 1/3 if the pulp is pelletized.

Tests that have been run to date indicate that pelleting does not adversely affect the physical properties of the pulp. Actually, it is claimed, the method lends itself to better quality control.

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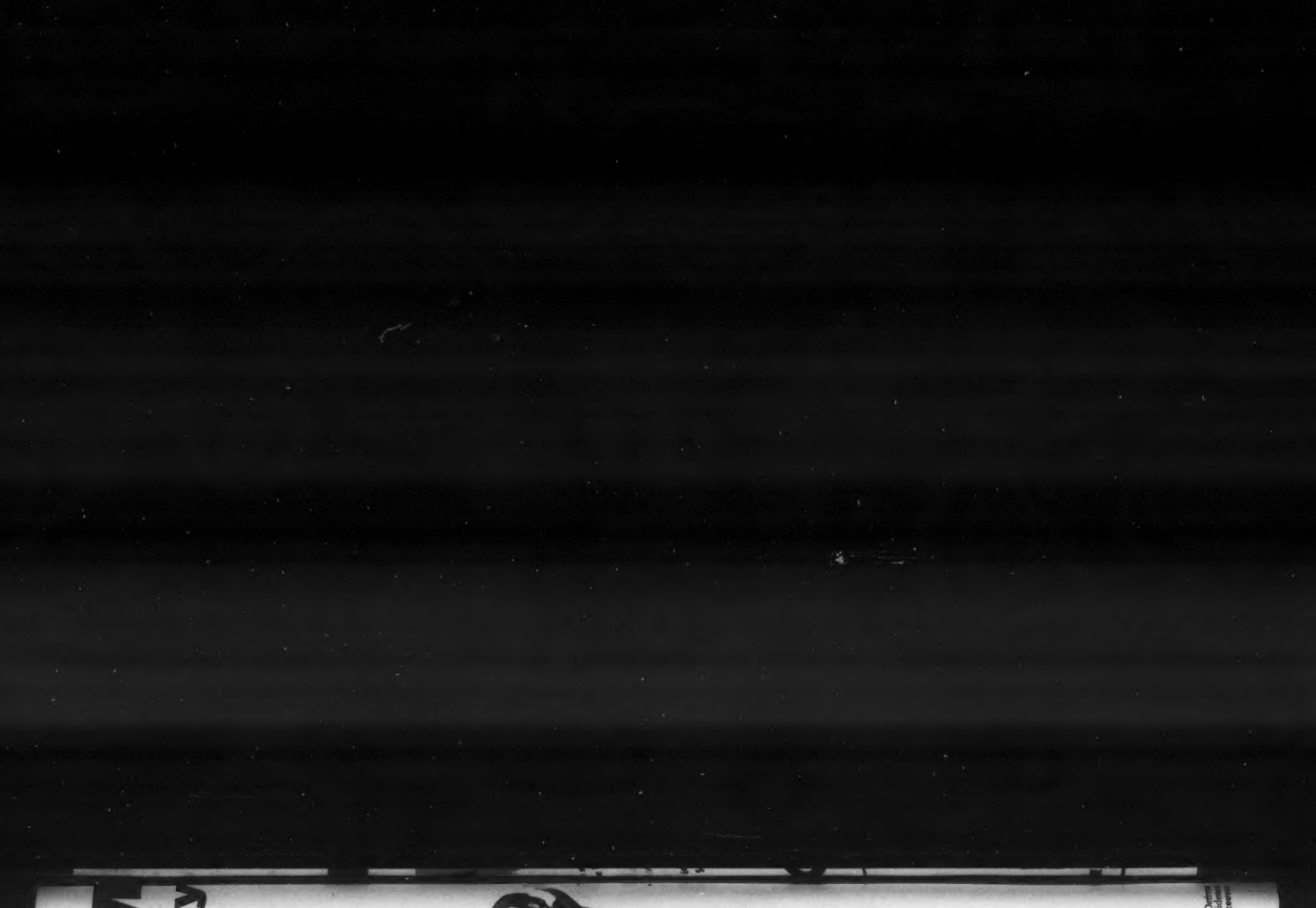
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